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Administration

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November 1984

Final Report

Side-Impact Aggressiveness Attributes
MDB-To-Car Side Impact Test of a 19° Crabbed Moving Deformable Barrier to a 1981 Volkswagen Rabbit at 45.9 Mph

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MDB-TO-CAR SIDE IMPACT TEST OF A 19° CRABBED MOVING DEFORMABLE BARRIER TO A 1981 VOLKSWAGEN RABBIT AT 45.9 MPH

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16. Abstract

This test report documents one of a series of twelve crash tests to evaluate the side impact aggressiveness attributes of various deformable barrier face configurations. The configurations to be used are designated as "Lowered Stiffness", "Altered Profile" and "Lowered Bumper". Testing was conducted on a 1981 diesel Volkswagen Rabbit 2-door hatchback at the TRCO Crash Test Facility, East Liberty, Ohio. The test vehicle was impacted on the left side by a moving deformable barrier designated as "Altered Profile", crabbed to 19°, at 45.9 mph. Occupant responses of two side impact dummies were measured. One dummy was located in the driver's designated seating position and one was located in the left rear passenger position. The test date was October 1, 1984 and the ambient temperature was 58° F.

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SECTION 1.0
PURPOSE AND INTRODUCTION

PURPOSE

The main purpose of this test was to evaluate the side impact aggressiveness of a deformable barrier face designated as "Altered Profile". In all, there will be twelve crash tests involving deformable barrier faces designated as "Lowered Stiffness", "Altered Profile" and "Lowered Bumper". The vehicle was tested using conditions not currently contained in a Federal Motor Vehicle Safety Standard.

INTRODUCTION

A stationary 1981 diesel Volkswagen Rabbit 2-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on October 1, 1984. The barrier face was designated as "Altered Profile". In order to obtain the desired stiffness of 45 psi, 33 holes with a nominal diameter of 3 inches were drilled into the aluminum honeycomb, equally spaced throughout the back of the barrier face. The test was to simulate an intersection collision with the striking vehicle traveling at 35 mph and the struck vehicle traveling at 17.5 mph. The orientation angle of the striking vehicle was 60° counterclockwise with respect to the longitudinal axis of the struck vehicle. The impact point was to be 37 inches forward of the vehicle center of gravity which is defined by accident investigation to be the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Volkswagen Rabbit at 46.3 mph with the MDB's wheels crabbed clockwise to 19°. The actual test speed was 45.9 mph and the actual impact point was 37.0 inches forward of the midpoint of the Volkswagen Rabbit's wheelbase. The vehicle was structurally unmodified and contained no additional padding.

Section 2 contains General Test and Vehicle Parameter Data. Section 3 contains data required by R & D. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Data Plots.

SECTION 2.0

GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test and Vehicle Parameter Data.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Volkswagen of America, Inc.

MAKE/MODEL: Volkswagen Rabbit Diesel VIN: 1VWBG0170BV199036

BODY STYLE: 2-Door Hatchback MODEL YEAR: 1981

NHTSA NO.: R & D COLOR: Champagne

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT 97 CID

TRANSMISSION DATA: 4 Speed Manual

DATE VEHICLE RECEIVED: 9/17/84 ODOMETER READING: 56271

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	AUTOMATIC TRANSMISSION	No
POWER BRAKES	No	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	Yes
OTHER			

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: Volkswagen of America, Inc.

DATE OF MANUFACTURE: 7/81

GVWR: 2822 LBS.,

GAWR: FRONT 1609 LBS., REAR 1278 LBS.

VEHICLE TIRE DATA

RECOMMENDED COLD TIRE PRESSURE: FRONT 27 psi; REAR 31 psi

TIRES ON VEHICLE (MFGR. & LINE, SIZE): Continental 155 SR 13

BIAS PLY, BELTED, OR RADIAL: Radial

PLY RATING: 4

IS SPARE TIRE "SPACE SAVER"? None

IS SPARE TIRE STANDARD EQUIPMENT? No

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH ESTIMATED FLUIDS):

RIGHT FRONT	675 LBS.	RIGHT REAR	340	LBS.
LEFT FRONT	580 LBS.	LEFT REAR	310	LBS.
TOTAL FRONT WEIGHT	1255	LBS. (65.9 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	650	LBS. (34.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL DELIVERED WEIGHT	1905	LBS.		

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	RF 24 1/2	;LF 24 3/16	;RR 24 3/4	;LR 24 9/16
PRE-TEST ATTITUDE:	RF 23 3/16	;LF 23 1/2	;RR 21 3/4	;LR 22 3/16
POST-TEST ATTITUDE:	RF 24 1/8	;LF 22 1/8	;RR 21 1/8	;LR 20 3/8

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 135 LBS. CARGO:

RIGHT FRONT	705 LBS.	RIGHT REAR	525	LBS.
LEFT FRONT	665 LBS.	LEFT REAR	555	LBS.
TOTAL FRONT WEIGHT	1370	LBS. (55.9 % OF TOTAL VEHICLE WEIGHT)		
TOTAL REAR WEIGHT	1080	LBS. (44.1 % OF TOTAL VEHICLE WEIGHT)		
TOTAL TEST WEIGHT	2450	LBS.		

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: 0 LBS.

TEST FLUID DATA

TEST FLUID TYPE: RED STODDARD SOLVENT #2; SPEC. GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

"USEABLE" CAPACITY*: NA GALLONS

TEST VOLUME: 2.0 GALLONS

FUEL SYSTEM CAPACITY (DATA FROM OWNERS MANUAL): 10.0 GALLONS

DETAILS OF FUEL SYSTEM: DNA

ELECTRIC FUEL PUMP: No FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? DNA

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 27 psi; REAR 27 psi

RECOMMENDED TIRE SIZE: 155 SR 13 LOAD RANGE X B, C,

VEHICLE CAPACITY: TYPES OF SEATS: Front - Bucket
Rear - Bench

NUMBER OF OCCUPANTS (DESIGNATED SEATING CAPACITY): 2 FRONT
2 REAR
4 TOTAL

CARGO LOAD 135 LBS.

TOTAL 735 LBS.

*WITH ENTIRE FUEL SYSTEM FILLED WITH FUEL TANK THROUGH CARBURETOR BOWL.

TEST CONDITIONS

TEST NUMBER: 841001

DATE OF TEST: October 1, 1984 TIME OF TEST: 14:25

WIND VELOCITY: 7-14 mph 351° NNW HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 58° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 78° F

SUBJECT VEHICLE DATA

	ACTUAL	INTENDED
VEHICLE TEST WEIGHT (LBS.)	2450	2448
MDB TEST WEIGHT (LBS.)	2990	3000
MDB VELOCITY (MPH)*	45.9	46.3
IMPACT POINT (INCHES)**	37.0	37.0

DUMMIES

	DRIVER	MIDDLE PASSENGER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
TYPE:	SID			SID	
SERIAL NO.:	06			U02	
INSTRUMENTATION:					
HEAD ACCEL.:	Yes			Yes	
CHEST ACCEL.:	Yes (Upper/Lower)			Yes (Upper/Lower)	
FEMUR L.C.'S:	No			No	
OTHER:	Pelvis/Ribs			Pelvis/Ribs	

RESTRAINT SYSTEM: Both dummies were unrestrained

* As measured over final one foot of travel.

** As measured forward of the midpoint of the vehicle's wheelbase.

VISIBLE DUMMY CONTACT POINTS:

	DRIVER 06	PASSENGER U02
Head	Barrier Face	Side Window Header, Barrier Face
Chest	Driver's Inner Door Panel	Left Rear Quarter Panel
Abdomen	Driver's Inner Door Panel	Left Rear Quarter Panel
Left Knee	Driver's Inner Door Panel	Left Rear Quarter Panel
Right Knee	Left Knee	Left Knee

DOOR OPENING:

	LEFT	RIGHT
Front	DNA*	Easy
Rear	DNA	DNA

SEAT MOVEMENT:

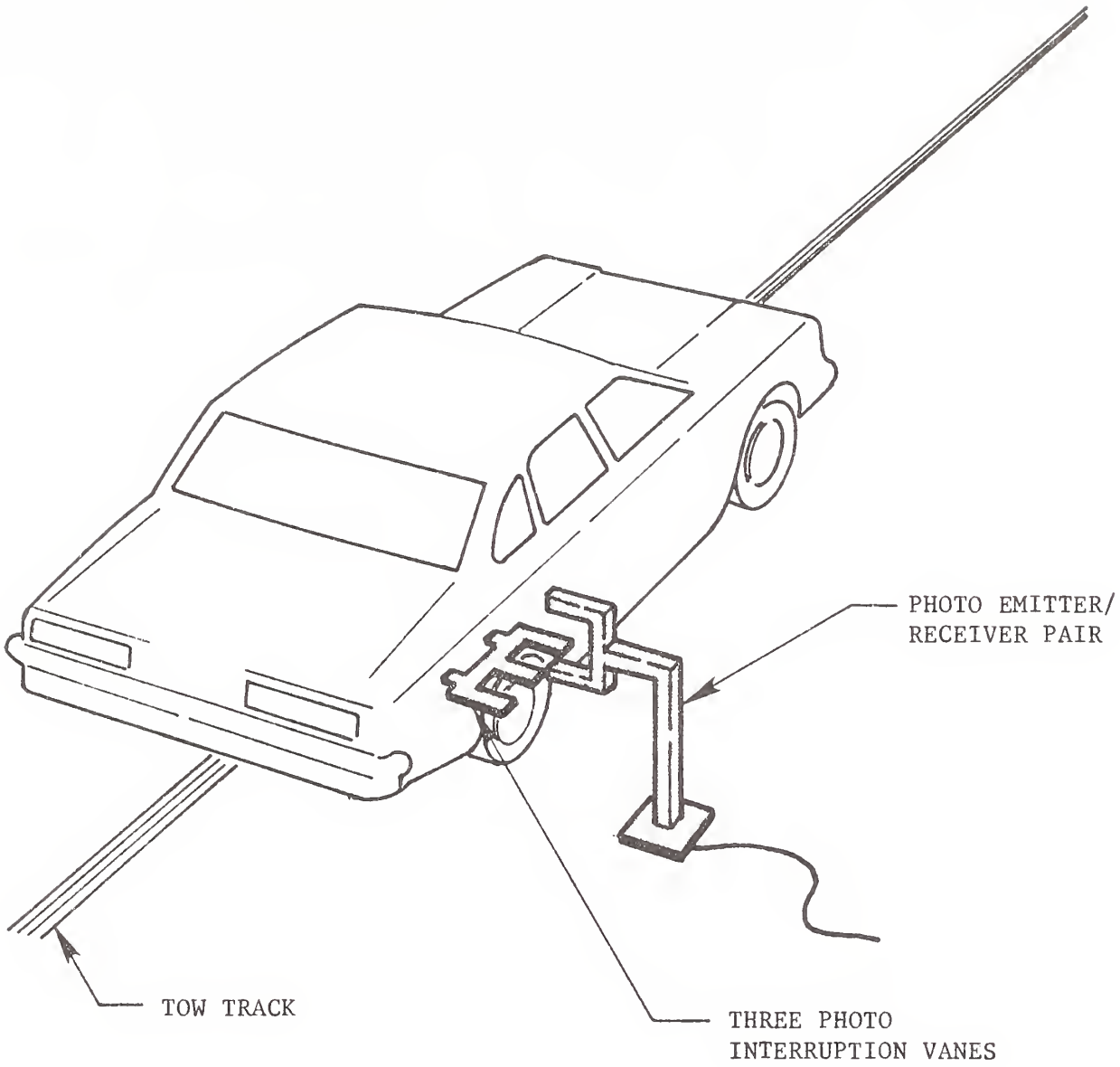
	SEAT BACK FAILURE	SEAT SHIFT
Front	Yes	Yes
Rear	Yes	Yes

GLAZING DAMAGE: Windshield shattered, all left side windows shattered, no backlight damage.

OTHER NOTABLE IMPACT EFFECTS:

Passenger dummy's right leg dismembered; driver's seat was badly damaged and pushed into the passenger seat. Driver's door separated from hinges.

*The driver's door was to remain closed for subsequent door opening effort studies.



The final vane is located two inches before impact.

The vanes have one foot spacing.

VEHICLE TEST WEIGHT CALCULATION

Test Weight = Unloaded Delivered Weight* +
Number of Dummies X 174 lbs. +
Cargo Weight
= 1965 + 2 X 174 + 135 lbs.
= 2448 lbs.

To achieve test weight, 2.0 gallons of Stoddard Solvent were added in the fuel tank. The weight of the test vehicle was measured by placing each wheel on a Loadmeter Corporation Hiway Loadometer.

*Unloaded Delivered Weight = Measured Weight + Estimated 10 Gallons Fuel
= 1905 + 60
= 1965

The redundant Left Lower Rib accelerometer on the passenger, LLRYGC, appears to have malfunctioned between 70 and 125 msec. Before and after this time interval the accelerometer recorded accurate data.

SECTION 3.0
DATA REQUIRED BY R & D

The following pages are included in this section:

1. Dummy temperature control and position data
2. Dummy kinematic summary
3. Vehicle crush data
4. Dummy and vehicle accelerometer location and data summary
5. High speed camera information
6. Transducer information

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperature inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained portably until approximately 1 minute prior to the test.

The following table summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

DUMMY PLACEMENT AND POSITIONING

SIDE IMPACT DUMMY	DRIVER DSP	REAR PASSENGER DSP
HEAD	Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.	Surface of transverse instrument mounting platform is as horizontal as possible without inducing torso movement & midsagittal plane falls in longitudinal plane.
UPPER TORSO	Placed against seat back. Midsagittal plane is vertical and centered on bucket seat.	Placed against seat back. Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.
LOWER TORSO	Midsagittal plane is vertical and centered on bucket seat.	Midsagittal plane is vertical and contained in the same longitudinal plane as the driver's midsagittal plane.
UPPER LEGS (thighs or femurs)	Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.	Placed against seat cushion. Planes defined by femur and tibia centerlines are as close as possible to vertical.
KNEES	Knees set 14.5" apart between pivot bolt head outer surfaces. Outer surface of right knee pivot bolt is 8.6" from midsagittal plane of dummy. Outer surface of left knee pivot bolt is 5.9" from midsagittal plane of dummy.	Located so that planes defined by femur and tibia centerlines are as close as possible to vertical.
LOWER LEGS	Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.	Plane defined by femur and tibia centerlines are as close as possible to vertical longitudinal plane.
RIGHT FOOT	Placed on undepressed accelerator pedal -- rearmost point of heel on floorplan in plane of pedal.	Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.
LEFT FOOT	Placed on toeboard -- rearmost point of heel on floorpan as close as possible to intersection of toeboard and floorpan. Centerline falls in vertical longitudinal plane.	Centerline falls in vertical longitudinal plane. Placed on floor as far forward as possible without front seat interference.

*NOTE: THE SIDE IMPACT DUMMY DOES NOT INCLUDE ARMS.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

VEHICLE NHTSA NO. R & D

MFR./MAKE/MODEL: Volkswagen Rabbit

FRONT SEAT TYPE: ____ BENCH
X BUCKET
____ SPLIT BENCH

ADJUSTER TYPE: X MANUAL
____ POWER

BUCKET SEAT BACK TYPE: ____ FIXED
X ADJUSTABLE

TECHNICIANS:
1. B. Miller
2. D. LeVally
3. J. Clarridge

POSITIONING DATE: 10/1/84

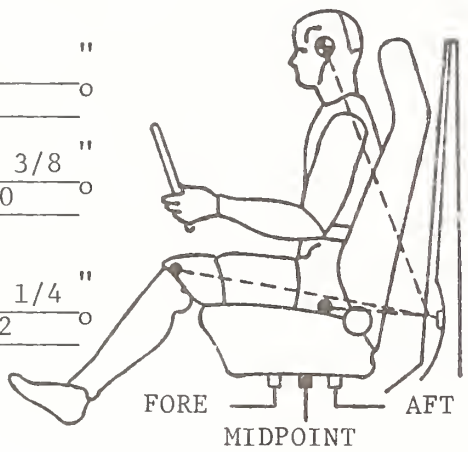
AMBIENT TEMP.: 64° F. TIME: 7:10

DRIVER DUMMY # 06

HEAD 20 "
TARGET* 32 °

KNEE 31 3/8 "
JOINT 100 °

APPROX.
"H" 18 1/4 "
POINT 122 °

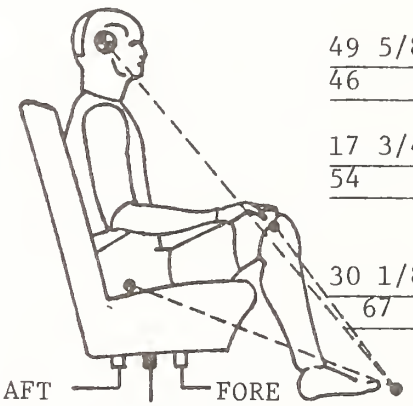


REAR PASSENGER DUMMY # U02

49 5/8 "HEAD
46 °TARGET**

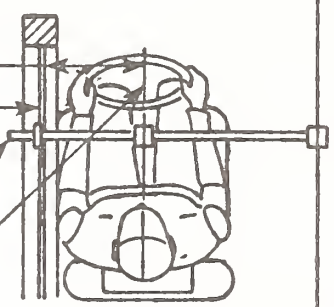
17 3/4 "KNEE
54 °JOINT

APPROX.
30 1/8 " "H"
67 °POINT



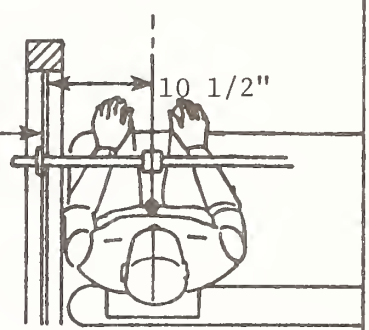
DOOR GLASS HEIGHT*** 11 3/8"
9 7/8"

LATERAL BAR ADJUSTABLE POINTER



DRIVER DUMMY # 06

DOOR GLASS HEIGHT DNA

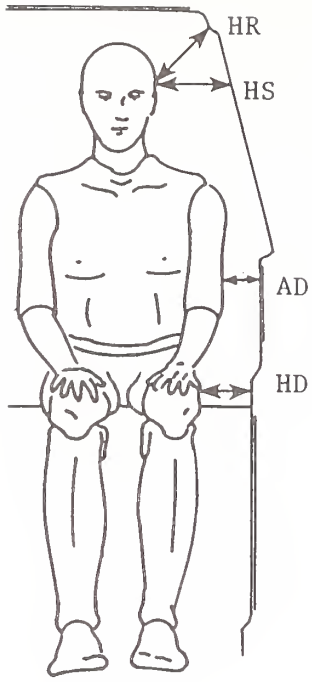


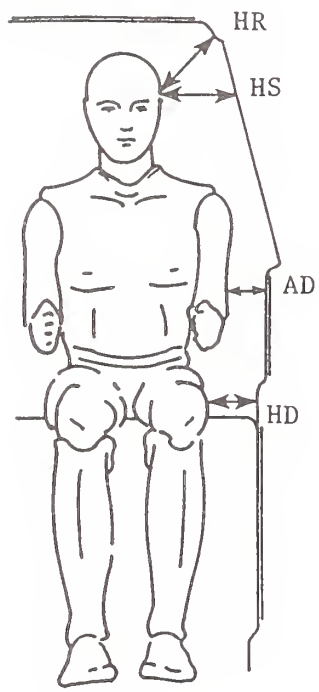
PASSENGER DUMMY # U02

*All driver dummy dimensions referenced to top of striker bolt and all angles referenced to vertical.

**All passenger dummy dimensions referenced to front seat back latch bolt with front seat in mid-position and all angles referenced to vertical.

***Door glass height is equal on the right and left side of vehicle at dummy nose level.

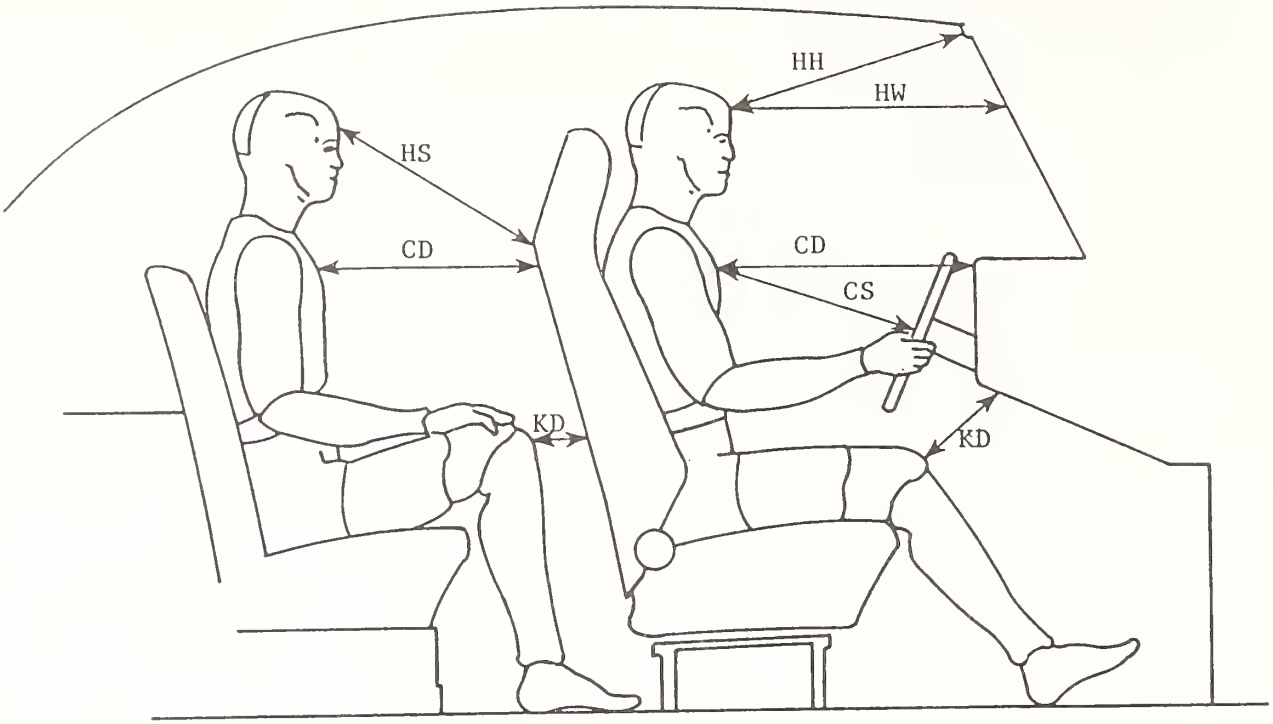




	DRIVER 06	PASSENGER U02
HR	7	6 3/8
HS	8 1/2	8
AD	4 7/8	4 1/2
HD	7 1/8	6 1/8

ALL MEASUREMENTS IN INCHES

DUMMY LATERAL CLEARANCE DIMENSIONS



	DRIVER 06	PASSENGER U02
HH	14 1/4	DNA
HW	19 3/4	DNA
HS	DNA	22 5/8
CD	19 3/4	17
CS	13 5/8	DNA
KDL	4 5/8	5 1/8
KDR	4	3 7/8

ALL MEASUREMENTS IN INCHES

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

DRIVER

During impact, the dummy's torso contacted the driver's inner door panel and the head contacted the top of the moving barrier face. The dummy rebounded from the driver's door and the buttocks struck the head liner. The dummy came to rest face down on the driver's seat with it's feet on the front passenger's floor.

PASSENGER

During impact, the dummy's torso contacted the left rear inner quarter panel and the head contacted the side header and the top of the moving barrier face. The dummy's torso rebounded from the inner quarter panel while it's feet became trapped under the driver's seat, breaking the dummy's right leg in the process. The dummy came to rest facing forward with it's shoulders and head sticking outside of the vehicle through the left rear side window.

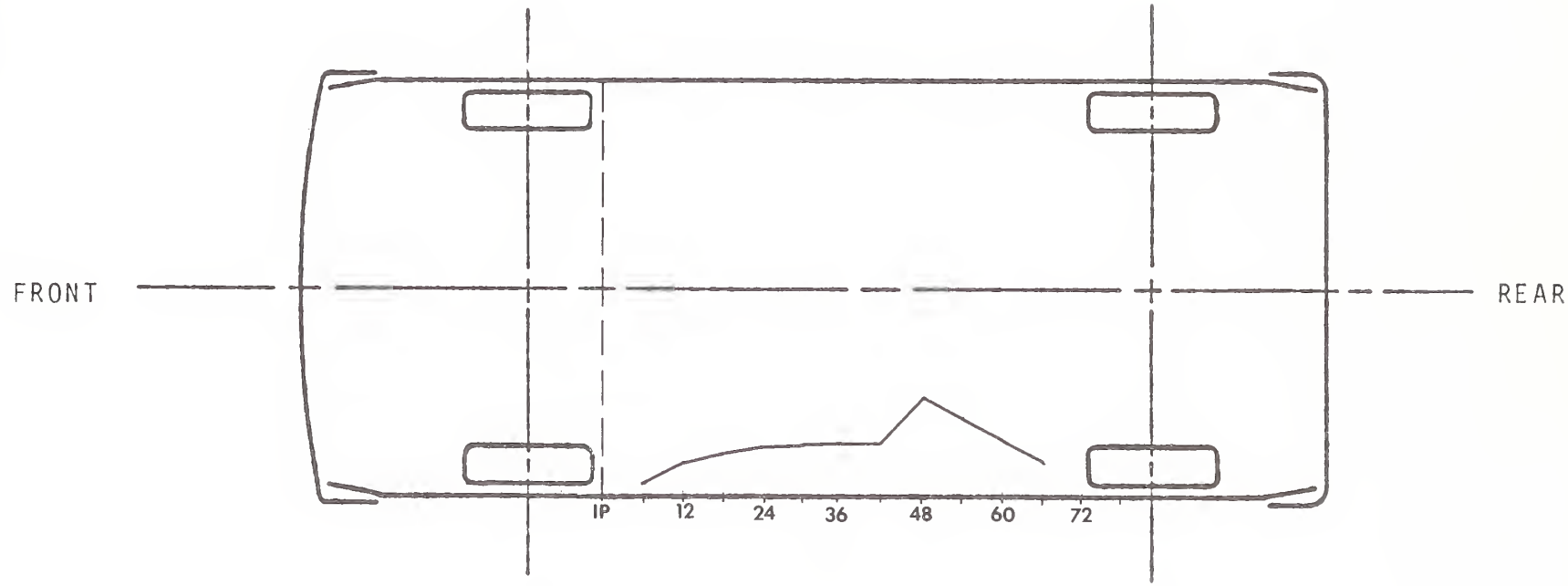
VEHICLE EXTERIOR PROFILES AND STATIC CRUSH

ZERO DISTANCE AT PROJECTED IMPACT POINT*

LOCATION	HEIGHT (in)	6	0	6	12	18	24	30	36	42	48	54	60	66	72	78
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	10.9	X	X	19.9	20.0	20.0	20.0	20.1	20.1	20.3	20.3	20.4	20.5	20.5	X	X
H-Point	21.4	X	17.0	17.9	18.0	18.0	18.0	18.0	18.0	18.1	18.1	18.3	18.3	18.4	18.4	X
Mid Door	24.1	16.5	17.8	17.7	17.8	17.8	17.8	17.8	17.8	17.8	17.8	18.0	18.0	18.1	18.3	17.0
Window Sill	35.1	19.8	19.5	19.3	19.3	19.3	19.1	19.3	19.3	19.3	19.3	19.5	19.5	19.6	19.8	19.9
Window Top	53.6	X	X	X	X	X	27.1	26.9	26.8	26.8	26.8	27.0	27.1	27.3	27.5	28.0
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Axle Height	10.9	X	X	21.9	25.0	26.3	27.3	27.6	27.8	27.9	34.9	32.3	28.8	25.3	X	X
H-Point	21.4	X	22.3	23.0	41.5	42.1	42.2	41.5	40.6	40.4	39.1	37.1	33.9	30.8	27.6	X
Mid Door	24.1	20.0	21.9	21.4	39.1	39.3	39.3	38.8	38.1	37.6	35.9	36.8	34.0	30.9	27.3	23.9
Window Sill	35.1	19.8	19.5	19.5	33.2	34.1	33.3	31.1	30.0	30.6	31.3	***	29.4	25.5	23.0	21.1
Window Top	53.6	X	X	X	X	X	26.2	26.0	26.1	26.2	26.4	26.5	26.6	26.8	27.0	27.0
STATIC CRUSH (IN)																
Axle Height	10.9	X	X	2.0	5.0	6.3	7.3	7.5	7.7	7.6	14.6	11.9	8.3	4.8	X	X
H-Point	21.4	X	5.3	5.1	23.5	24.1	24.2	23.5	22.6	22.3	21.0	18.8	15.6	12.4	9.2	X
Mid Door	24.1	3.5	4.1	3.7	21.3	21.5	21.5	21.0	20.3	19.8	18.1	18.8	16.0	12.8	9.0	6.9
Window Sill	35.1	0.0	0.0	0.2	13.9	14.8	14.2	11.8	10.7	11.3	12.0	***	9.9	5.9	3.2	1.2
Window Top	53.6	X	X	X	X	X	-0.9	-0.9	-0.7	-0.6	-0.4	-0.5	-0.5	-0.5	-0.5	-1.0

* Projected impact point is 37 inches forward of driver's side wheelbase midpoint. Column readings are front to rear from left to right.
** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.
*** Data point was not available following test.

VEHICLE EXTERIOR STATIC CRUSH PROFILE

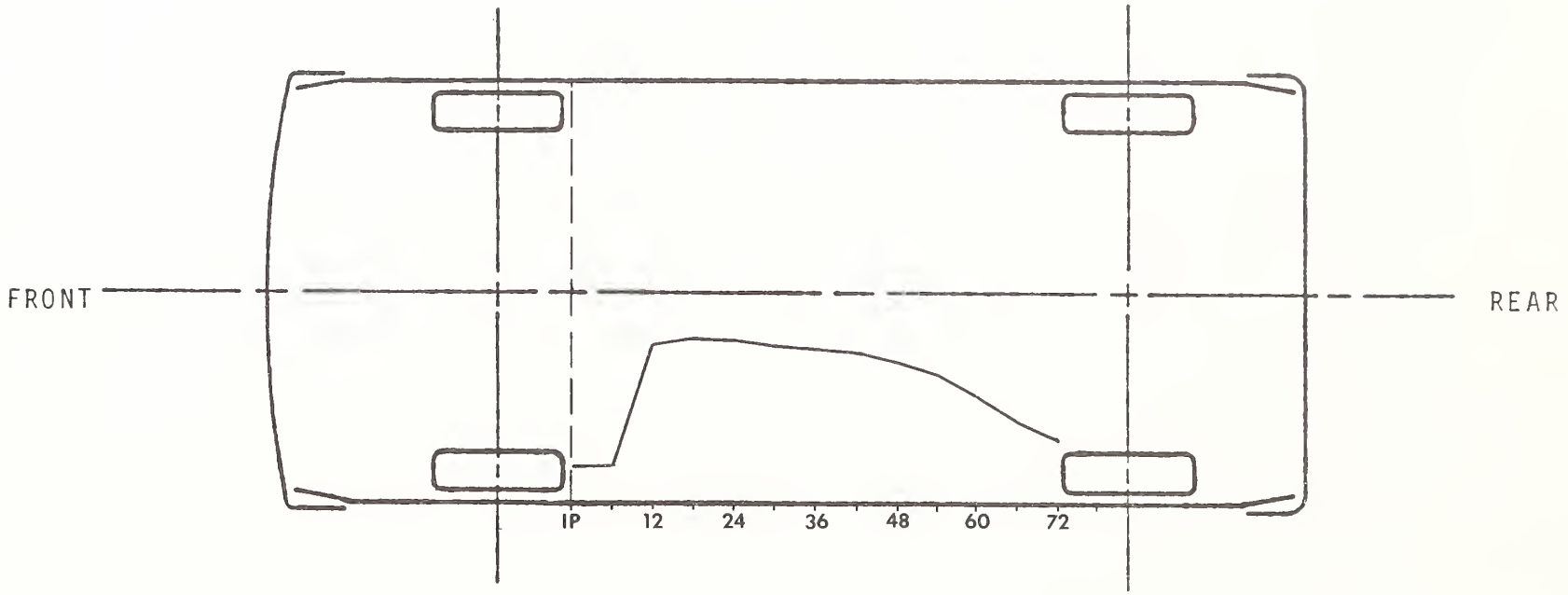


PROFILE LEVEL EQUALS AXLE HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 153.75"
Width of Car = 63.4"

Maximum Crush = 14.6"
Approximate Length of Crush = 60"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

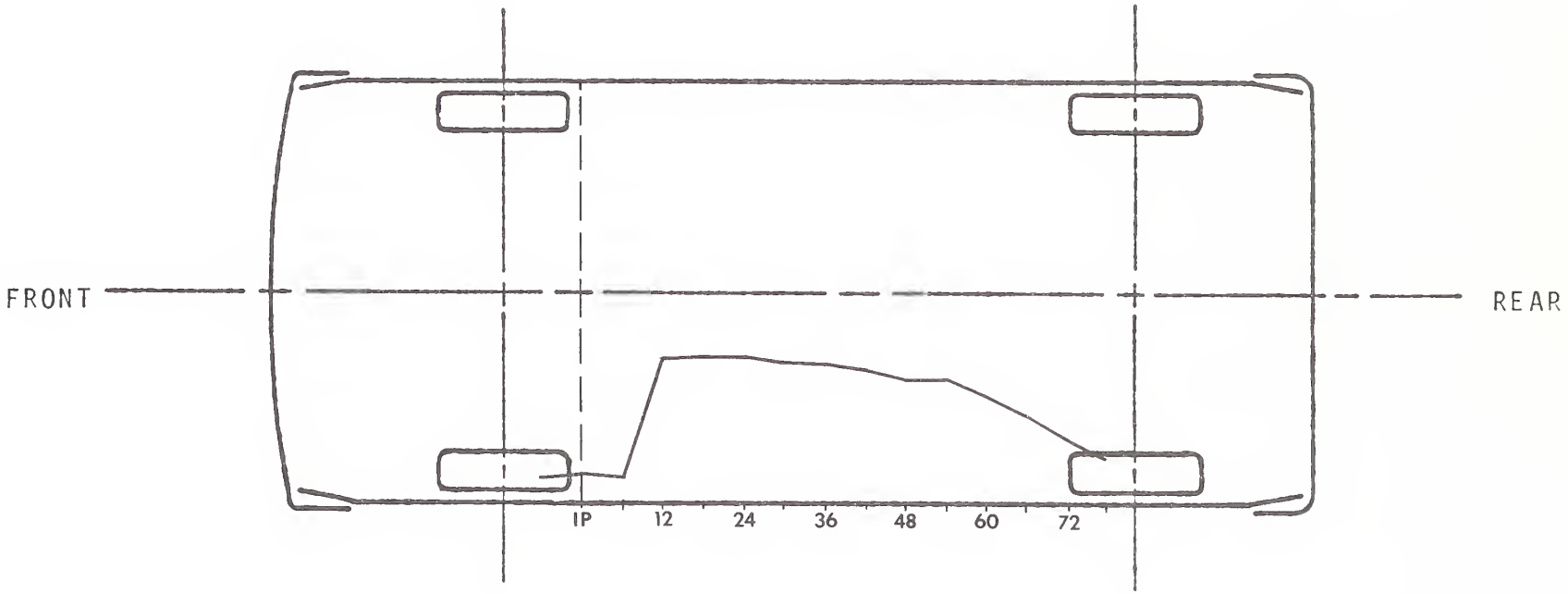


PROFILE LEVEL EQUALS H-POINT HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 153.75"
Width of Car = 63.4"

Maximum Crush = 24.2"
Approximate Length of Crush = 72"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

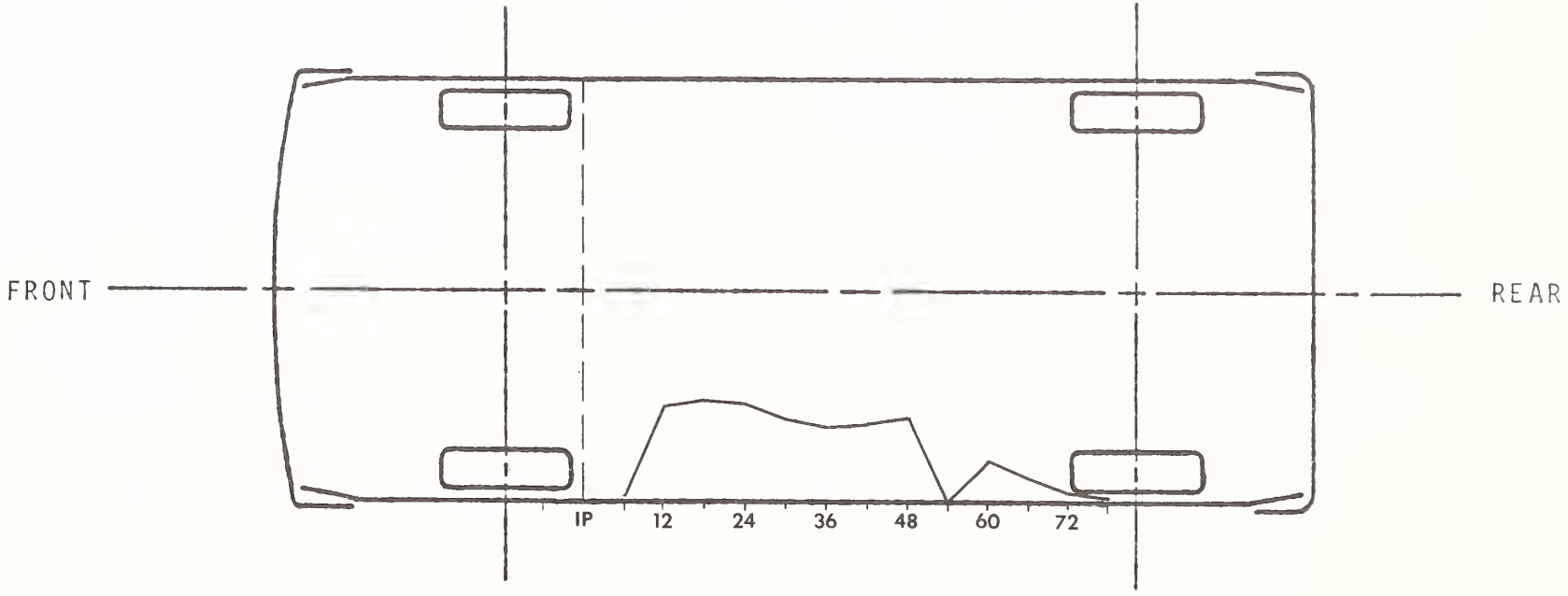


PROFILE LEVEL EQUALS MID-DOOR HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 153.75"
Width of Car = 63.4"

Maximum Crush = 21.5"
Approximate Length of Crush = 84"

VEHICLE EXTERIOR STATIC CRUSH PROFILE

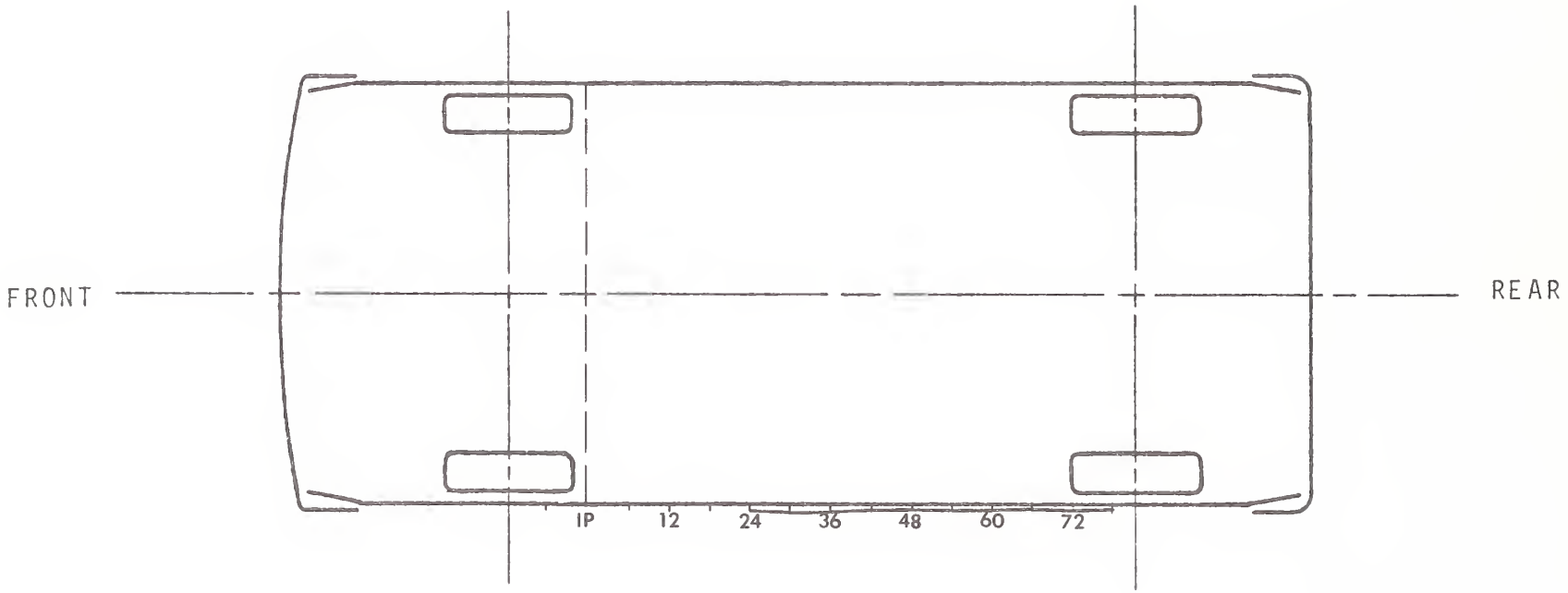


PROFILE LEVEL EQUALS WINDOW SILL HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 153.75"
Width of Car = 63.4"

Maximum Crush = 14.8"
Approximate Length of Crush = 60"

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT
IP EQUALS PROJECTED IMPACT POINT

Length of Car = 153.75"
Width of Car = 63.4"

Maximum Crush = -0.9"
Approximate Length of Crush = 54"

SIDE IMPACT DUMMY DATA SUMMARY

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)	MAX (g)	TIME (msec)
HEAD ACCELERATION								
LONGITUDINAL	21.11	87.63	---	--- δ	40.55	94.62	53.05	79.75
LATERAL	---	--- δ	---	--- δ	51.20	80.25	49.01	95.75
VERTICAL	---	--- δ	---	--- δ	70.04	95.12	83.25	79.50
RESULTANT		--- @	--- δ			107.36 @	79.50	
HIC	---	---	--- δ		---	---	--- δ	
CHEST ACCELERATION								
UPPER SPINE								
LONGITUDINAL	40.71	101.25	97.40	83.12	15.68	75.00	51.18	98.75
LATERAL (P)***	73.30	83.12	31.17	43.75	70.32	81.88	34.71	73.13
LATERAL (R)***	72.65	83.12	30.54	43.75	75.22	81.88	32.91	73.13
VERTICAL	34.97	41.87	48.99	82.50	21.06	68.13	46.77	84.38
RESULTANT (P)		131.03 @	83.12			89.22 @	81.88	
RESULTANT (R)		130.67 @	83.12			93.13 @	81.88	
DELTA V (MPH)****		24.2 @	102.50 (P)			21.5 @	131.25 (P)	
		26.8 @	103.13 (R)			23.3 @	131.25 (R)	
LOWER SPINE								
LONGITUDINAL	26.84	81.88	33.75	88.13	31.15	71.88	45.04	76.25
LATERAL (P)	67.05	49.37	27.58	81.25	99.82	73.75	14.60	119.38
LATERAL (R)	68.00	49.37	25.99	81.88	97.08	74.37	15.09	119.38
VERTICAL	36.93	41.87	29.84	82.50	37.74	78.13	9.60	86.88
RESULTANT (P)		68.26 @	48.75			103.20 @	75.62	
RESULTANT (R)		69.06 @	49.37			104.29 @	75.62	
DELTA V (MPH)		27.5 @	101.25 (P)			24.2 @	91.87 (P)	
		29.0 @	101.88 (R)			25.3 @	93.13 (R)	
LEFT UPPER RIB								
LATERAL (P)	80.66	67.50	35.52	55.00	85.21	88.75	5.18	121.25
LATERAL (R)	88.67	85.63	40.14	55.00	75.87	88.75	6.96	121.25
DELTA V (MPH)		39.5 @	99.38 (P)			35.1 @	133.13 (P)	
		39.8 @	98.12 (R)			34.2 @	133.13 (R)	
LEFT LOWER RIB								
LATERAL (P)	72.50	57.50	18.18	91.87	83.21	78.75	15.96	125.00
LATERAL (R)	72.99	57.50	22.94	91.87	---	--- γ	---	--- γ
DELTA V (MPH)		36.1 @	90.00 (P)			33.3 @	132.50 (P)	
		37.4 @	90.00 (R)			--- @	--- (R) γ	
PELVIS ACCELERATION								
LONGITUDINAL	14.73	89.88	74.85	44.38	23.84	98.50	116.99	69.25
LATERAL	---	--- ο	---	--- ο	190.68	68.88	47.00	50.63
VERTICAL	---	--- ο	---	--- ο	45.71	73.75	4.42	105.62
RESULTANT		--- @	--- ο			224.02 @	69.00	
DELTA V (MPH)		--- @	--- ο			33.7 @	90.25	

SIDE IMPACT DUMMY DATA SUMMARY CONTD

	DRIVER DUMMY				PASSENGER DUMMY			
	POSITIVE DIRECTION*		NEGATIVE DIRECTION**		POSITIVE DIRECTION*		NEGATIVE DIRECTION**	
	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)	MAX (in)	TIME (msec)
RIB DEFLECTION †	0.19	75.63	0.13	88.50	0.34	96.13	0.04	131.50

* LONGITUDINAL:	FORWARD	**LONGITUDINAL:	REARWARD
LATERAL:	RIGHTWARD	LATERAL:	LEFTWARD
VERTICAL:	UPWARD	VERTICAL:	DOWNWARD

*** (P) = Primary Sensor, (R) = Redundant Sensor

**** For dummy channels, Delta V is the velocity change at the approximate time of separation from the contact area.

† Compression: Positive

δ See Plots

ϒ See TEST ANOMALIES

o The CTM has judged that intermittent rattling has occurred in these channels and, therefore, the peak values reported are questionable as are applicable resultants and Delta V's.

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

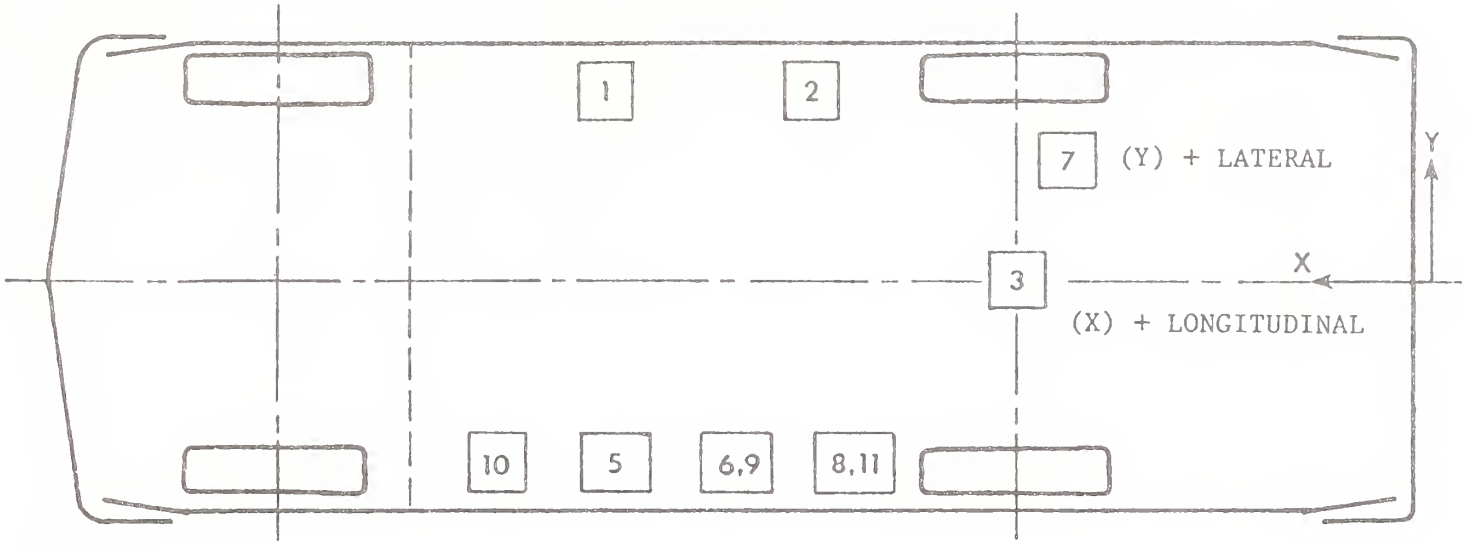
NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX (g)	POSITIVE DIRECTION TIME (msec)	NEGATIVE DIRECTION MAX (g)	NEGATIVE DIRECTION TIME (msec)
1	RIGHT SILL AT FRONT SEAT	83.5	23.4	10.0				
	(LONGITUDINAL)	Δ V = -8.5 mph @ 139.50 msec			1.17	61.12	8.09	104.50
	(LATERAL)	Δ V = 12.6 mph @ 139.50 msec			19.45	75.38	3.48	24.25
	(VERTICAL)				13.11	55.00	10.42	74.38
	(RESULTANT)					22.48 @ 74.88		
2	RIGHT SILL AT REAR SEAT	61.6	23.4	9.1				
	(LONGITUDINAL)	Δ V = -6.7 mph @ 139.50 msec			1.63	61.25	7.81	56.38
	(LATERAL)	Δ V = 17.1 mph @ 139.50 msec			23.15	77.50	3.31	24.38
	(VERTICAL)				7.90	54.63	8.68	74.63
	(RESULTANT)					23.85 @ 76.38		
3	REAR DECK OVER AXLE	32.0	0.0	7.0				
	(LONGITUDINAL)	Δ V = -24.2 mph @ 139.50 msec			3.37	128.88	27.91	79.00
	(LATERAL)	Δ V = 12.9 mph @ 139.50 msec			20.81	60.75	5.08	52.13
	(VERTICAL)				10.45	50.25	10.82	60.50
	(RESULTANT)					31.56 @ 70.38		
4	LEFT SILL AT REAR SEAT	61.4	-23.9	9.0				
	(LATERAL)	Δ V = 18.1 mph @ 62.13 msec			74.89	51.50	51.15	67.50
5	LEFT SILL AT FRONT SEAT	83.5	-23.3	9.0				
	(LATERAL)	Δ V = 14.2 mph @ 58.38 msec[T]			47.36	59.13	61.30	65.25
6	LEFT FRONT DOOR CENTERLINE	80.5	-26.1	23.1				
	(LATERAL)	Δ V = 25.0 mph @ 59.75 msec			118.98	29.63	112.54	45.25
7	RIGHT REAR COMPARTMENT	31.0	16.1	15.0				
	(LONGITUDINAL)				2.34	42.62	10.51	70.00
8	MIDREAR OF LEFT FRONT DOOR	60.4	-26.5	23.9				
	(LATERAL)	Δ V = 18.5 mph @ 47.13 msec[T]			125.57	32.38	69.91	51.75
9	UPPER LEFT FRONT DOOR CENTERLINE	81.5	-26.1	32.3				
	(LATERAL)	Δ V = 27.8 mph @ 66.50 msec[T]			75.99	54.88	157.89	75.88
10	MIDFRONT OF LEFT FRONT DOOR	99.9	-26.1	21.8				
	(LATERAL)	Δ V = 22.9 mph @ 22.75 msec			141.32	12.63	76.32	45.75
11	UPPER REAR OF LEFT REAR DOOR	70.5	-26.1	32.3				
	(LATERAL)	Δ V = 26.7 mph @ 64.00 msec[T]			116.30	58.75	78.74	77.25

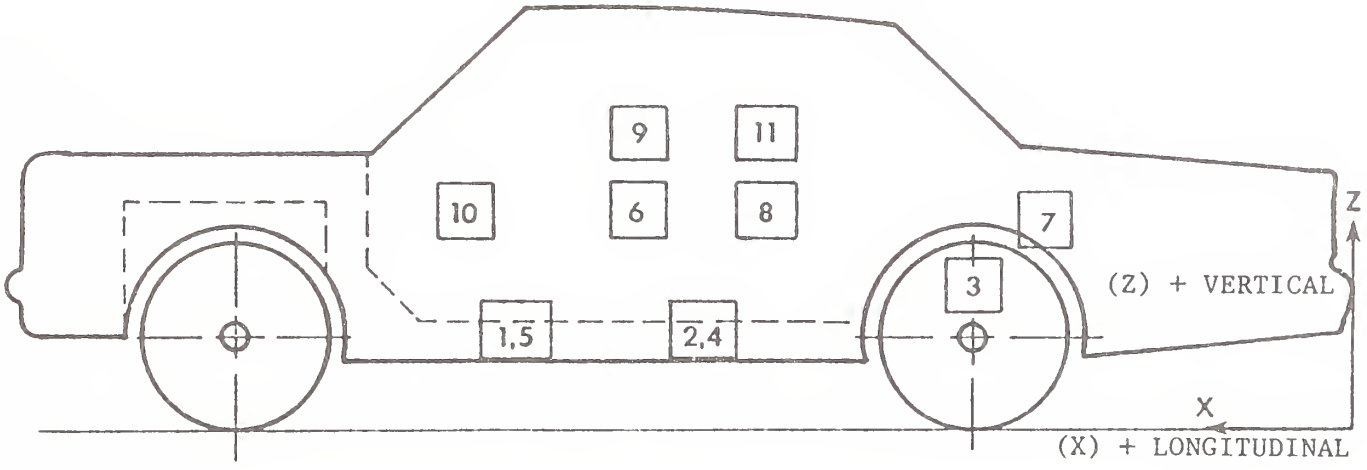
* Reference: X - Rear Bumper (+ Forward), Y - Vehicle Centerline (+ To Right), Z - Ground Level (+ Up)

All measurements of accelerometer locations in inches.

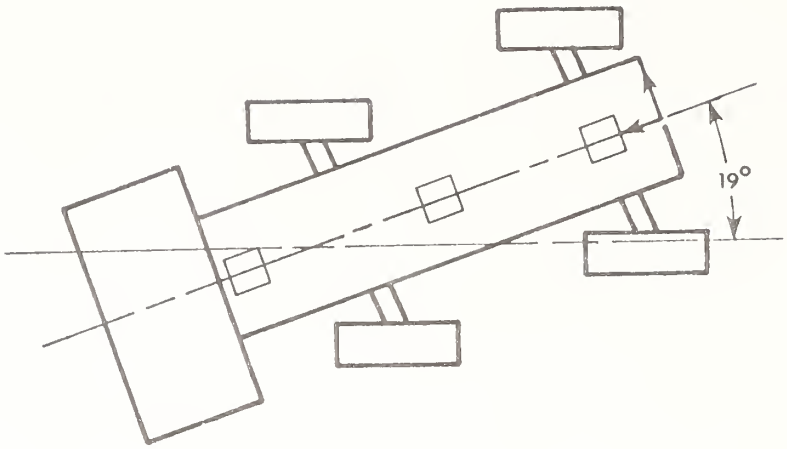
[T] This Delta V appears unrealistic.

VEHICLE ACCELEROMETER LOCATIONS





MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY



NO.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION MAX (g)	POSITIVE DIRECTION TIME (msec)	NEGATIVE DIRECTION MAX (g)	NEGATIVE DIRECTION TIME (msec)
1	CENTER OF GRAVITY	74.5	0.0	11.5				
	(LONGITUDINAL)	ΔV = -16.6 mph @ 139.50 msec			0.68	4.12	12.45	75.50
	(LATERAL)	ΔV = -4.7 mph @ 139.50 msec			1.47	30.12	5.09	92.75
	(VERTICAL)				14.43	98.38	15.66	87.88
	(RESULTANT)					18.43 @ 87.75		
2	FRONT FRAME MEMBER	130.3	0.0	11.3				
	(LONGITUDINAL)	ΔV = -18.9 mph @ 139.50 msec			---	---[x]	13.02	74.75
3	REAR FRAME MEMBER	23.3	0.0	11.5				
	(LONGITUDINAL)	ΔV = -15.9 mph @ 139.50 msec			0.47	129.88	11.96	57.75

* Reference: X - Rear Most Point of Frame (+ To Forward), Y - Barrier Centerline (+ To Right), Z - Ground Level (+ To Up)

All measurements of accelerometer locations in inches.

[x] There were no positive values in the time interval of interest.

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Overhead	Photosonic 1B	8	500	Vehicle dynamics
2	Overhead	Photosonic 1B	25	500	Close-up of impact point
3	Onboard MDB	Photosonic 1B	25	500	Close-up of impact point
4	Onboard MDB	Stalex	13	500	Driver kinematics
5	Ground level - right	Photosonic 1B	25	500	Overall View
6	Ground level - left	Photosonic 1B	17	500	Overall view
7	Onboard vehicle	Photosonic 1B	8	800	Driver kinematics - front view
8	Onboard vehicle	Photosonic 1B	8	800	Driver kinematics
9	Onboard vehicle	Photosonic 1B	8	800	Passenger kinematics

NOTE: CAMERAS ARE NUMBERED ACCORDING TO SPLICING SEQUENCE OF FILM. (24 fps) REAL TIME MOVIE FILM COVERAGE OF PRE-CRASH, POST-CRASH AND CRASH EVENT SPLICED AT START AND END OF FILM.

LOCATIONS OF OFFBOARD HIGH SPEED CAMERAS

CAMERA NO.	X	Y	Z
1	0	0	25'
2	0	0	25'
5	26'4"	60'	45"
6	-19'7"	-11'3"	45"

Origin of Coordinate System is Point of Impact

+X = Forward with Respect to Striking Vehicle's Velocity Vector
+Y = Rightward with Respect to Striking Vehicle's Velocity Vector
+Z = Upward with Respect to Striking Vehicle's Velocity Vector

NON-GOVERNMENT FURNISHED TRANSDUCER INFORMATION

PARAMETER BEING MEASURED	TYPE OF TRANSDUCER	MODEL NUMBER	SERIAL NUMBER	MFGR.	DATE OF LAST CALIBRATION	SENSITIVITY	DESIRED FULL SCALE (ENGR. UNITS)
BCGXG	Accel	4-202-0001	18845	Bell Howell	5/2/84	0.237 MV/G	50 G
BCGYG	Accel	4-202-0001	18858	Bell Howell	5/2/84	0.236 MV/G	50 G
BCGZG	Accel	4-202-0001	18857	Bell Howell	5/2/84	0.239 MV/G	50 G
BFCXG	Accel	4-202-0001	18240	Bell Howell	5/2/84	0.239 MV/G	50 G
BRCXG	Accel	4-202-0001	19022	Bell Howell	5/2/84	0.220 MV/G	50 G

All dummy and struck vehicle accelerometers were Government Furnished Equipment and were Endevco 2264 Accelerometers.

APPENDIX A

PHOTOGRAPHS

Figure A-1. PRE-TEST OVERALL - VIEW 1

Figure A-2. PRE-TEST OVERALL - VIEW 2

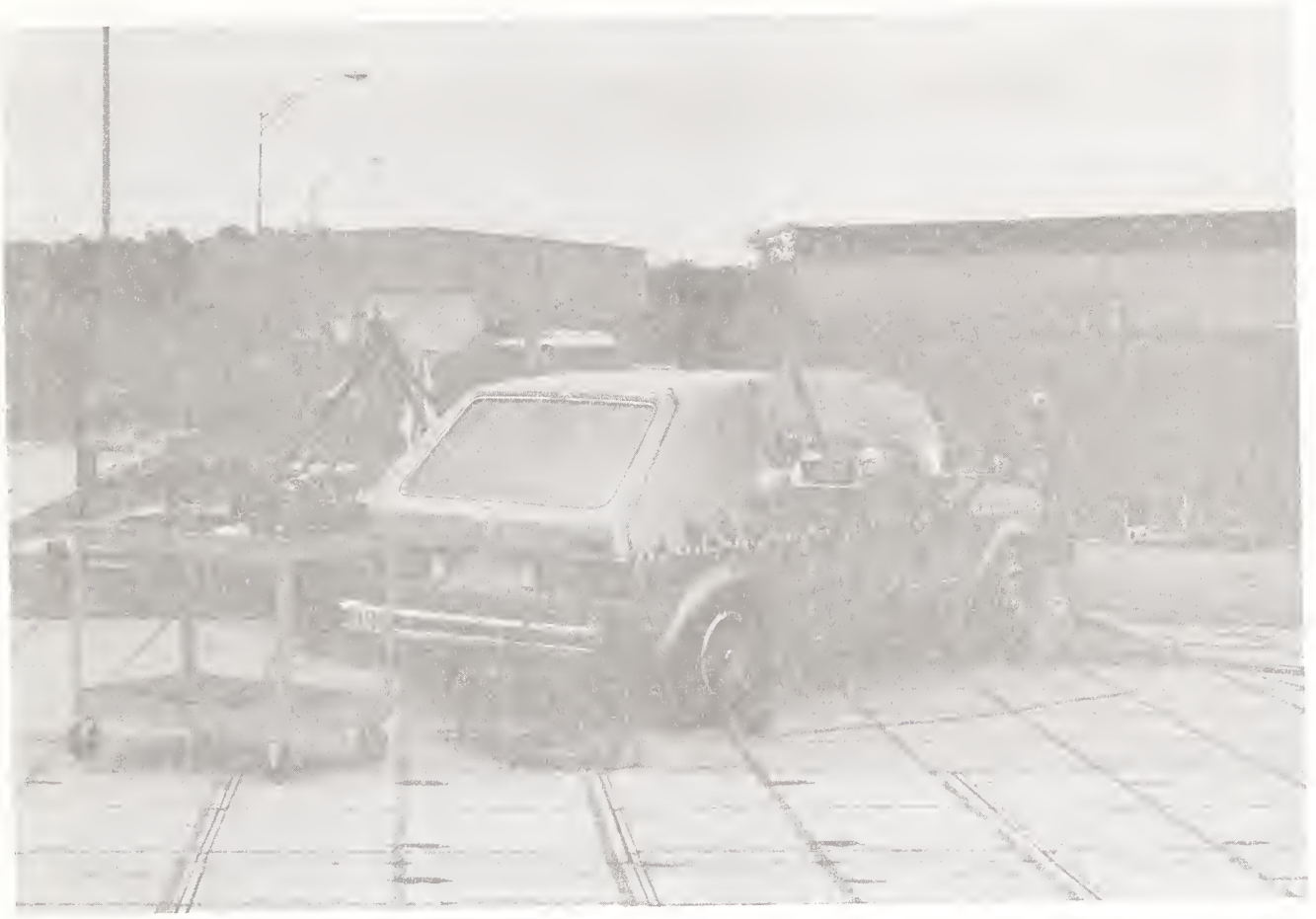


Figure A-3. PRE-TEST OVERALL - VIEW 3

Figure A-4. PRE-TEST OVERALL - VIEW 4

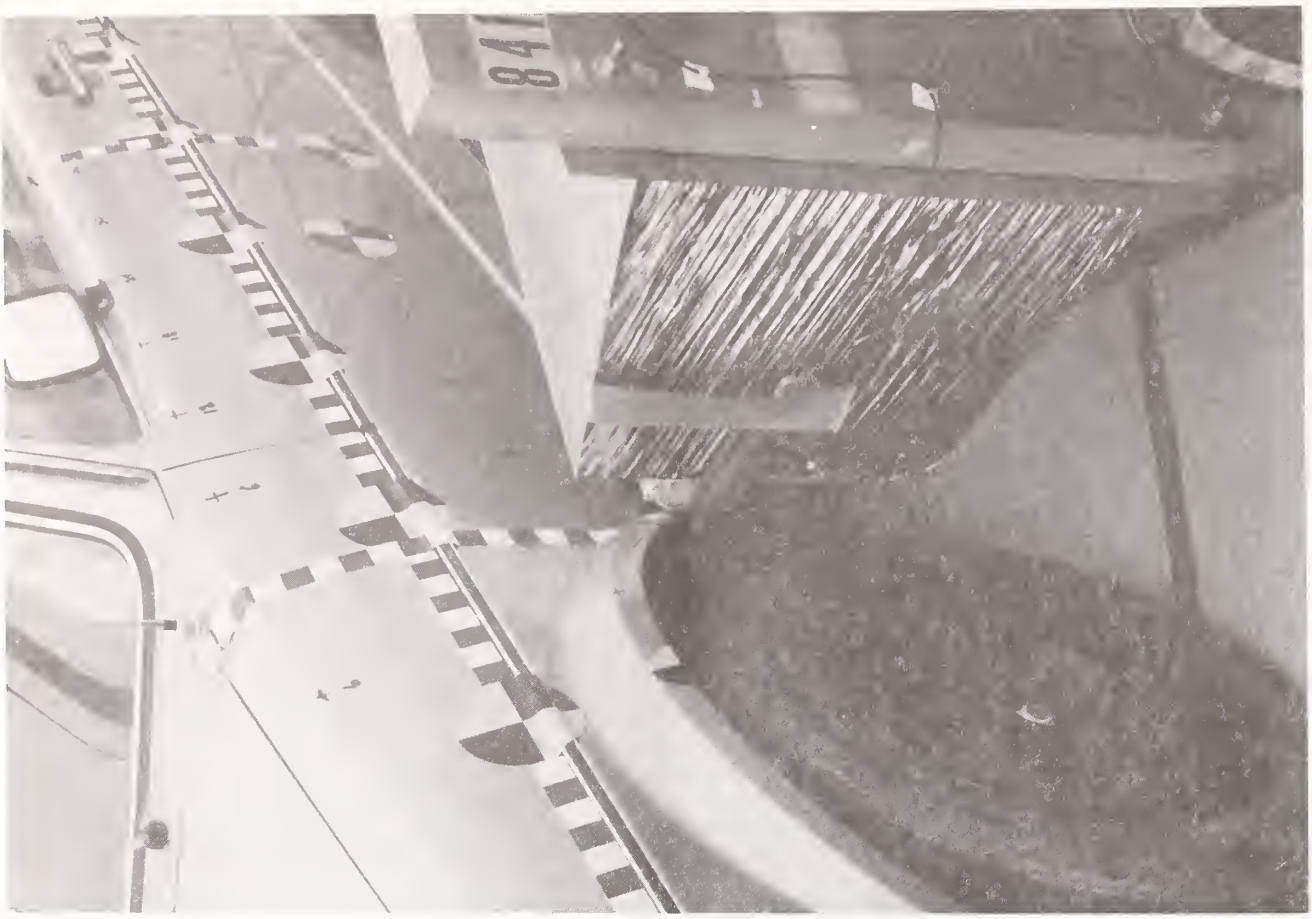


Figure A-5. PRE-TEST CLOSEUP - VIEW 1

Figure A-6. PRE-TEST CLOSEUP - VIEW 2

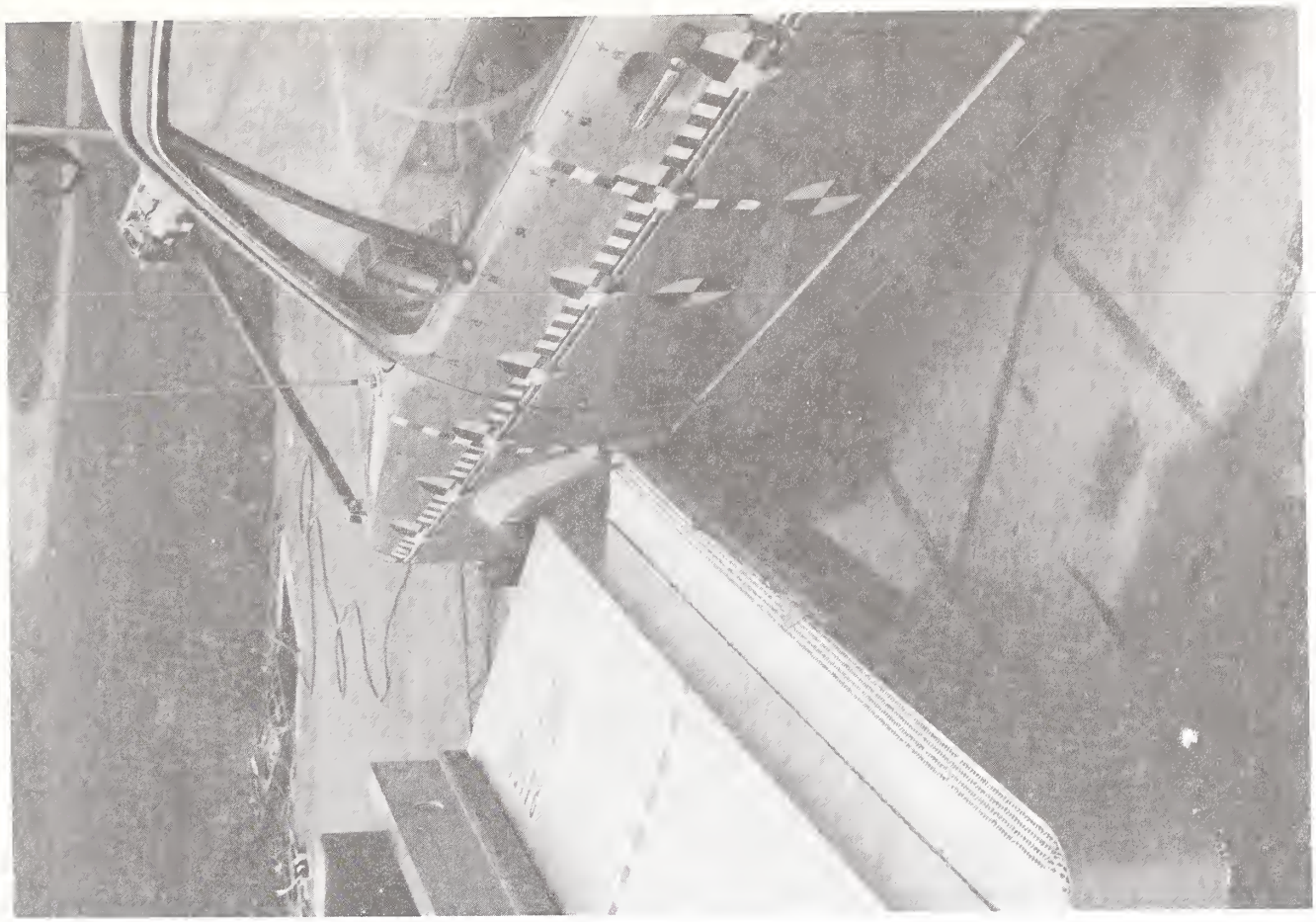


Figure A-7. PRE-TEST CLOSEUP - VIEW 3

Figure A-8. PRE-TEST DRIVER DUMMY -- VIEW 1

Figure A-9. PRE-TEST DRIVER DUMMY - VIEW 2

Figure A-10. PRE-TEST PASSENGER DUMMY - VIEW 1

Figure A-11. PRE-TEST PASSENGER DUMMY - VIEW 2

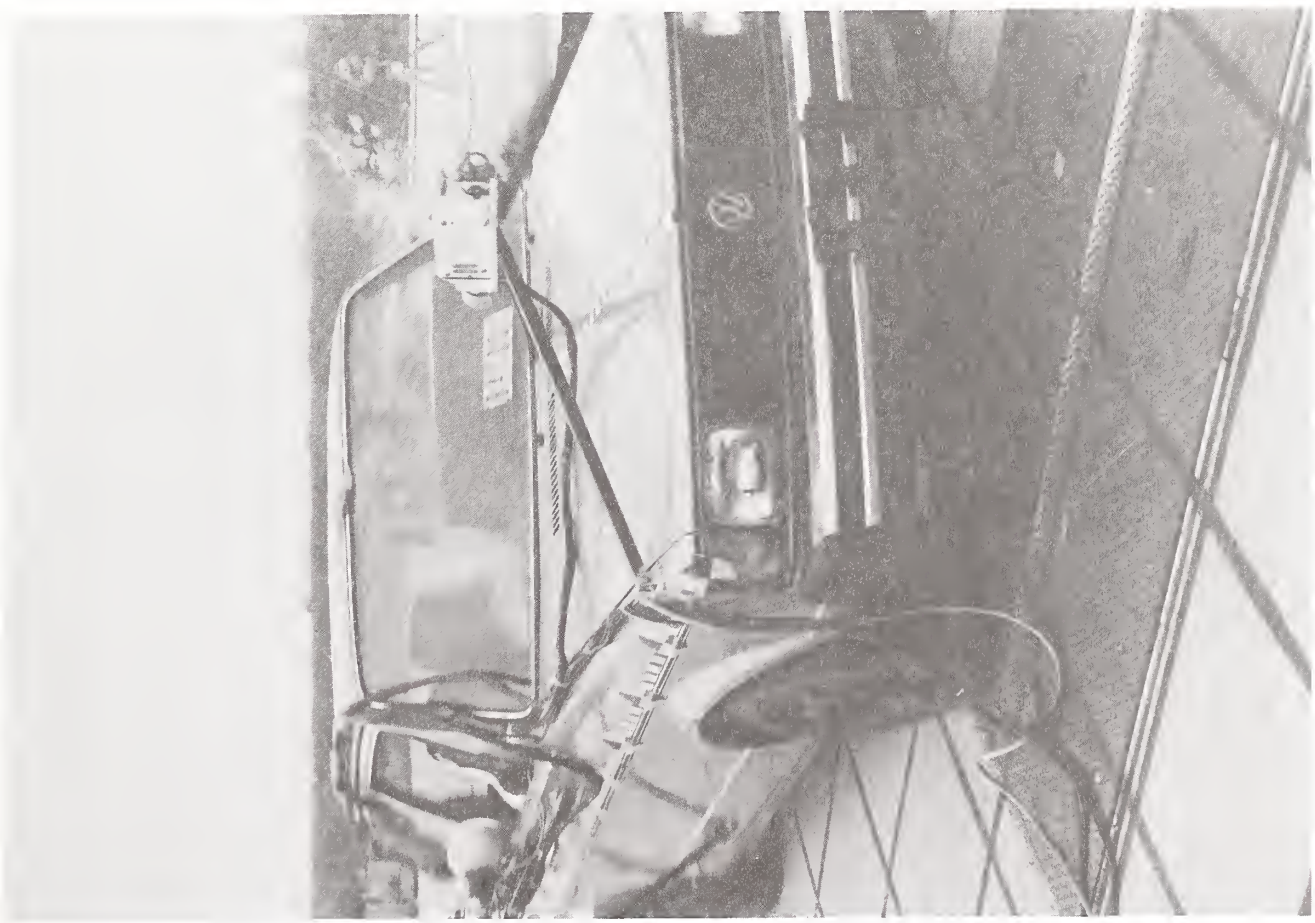


Figure A-12. CRASH EVENT PHOTOGRAPH

Figure A-13. POST-TEST OVERALL - VIEW 1

Figure A-14. POST-TEST OVERALL - VIEW 2

Figure A-15. POST-TEST OVERALL - VIEW 3

Figure A-16. POST-TEST OVERALL - VIEW 4

Figure A-17. POST-TEST CLOSEUP

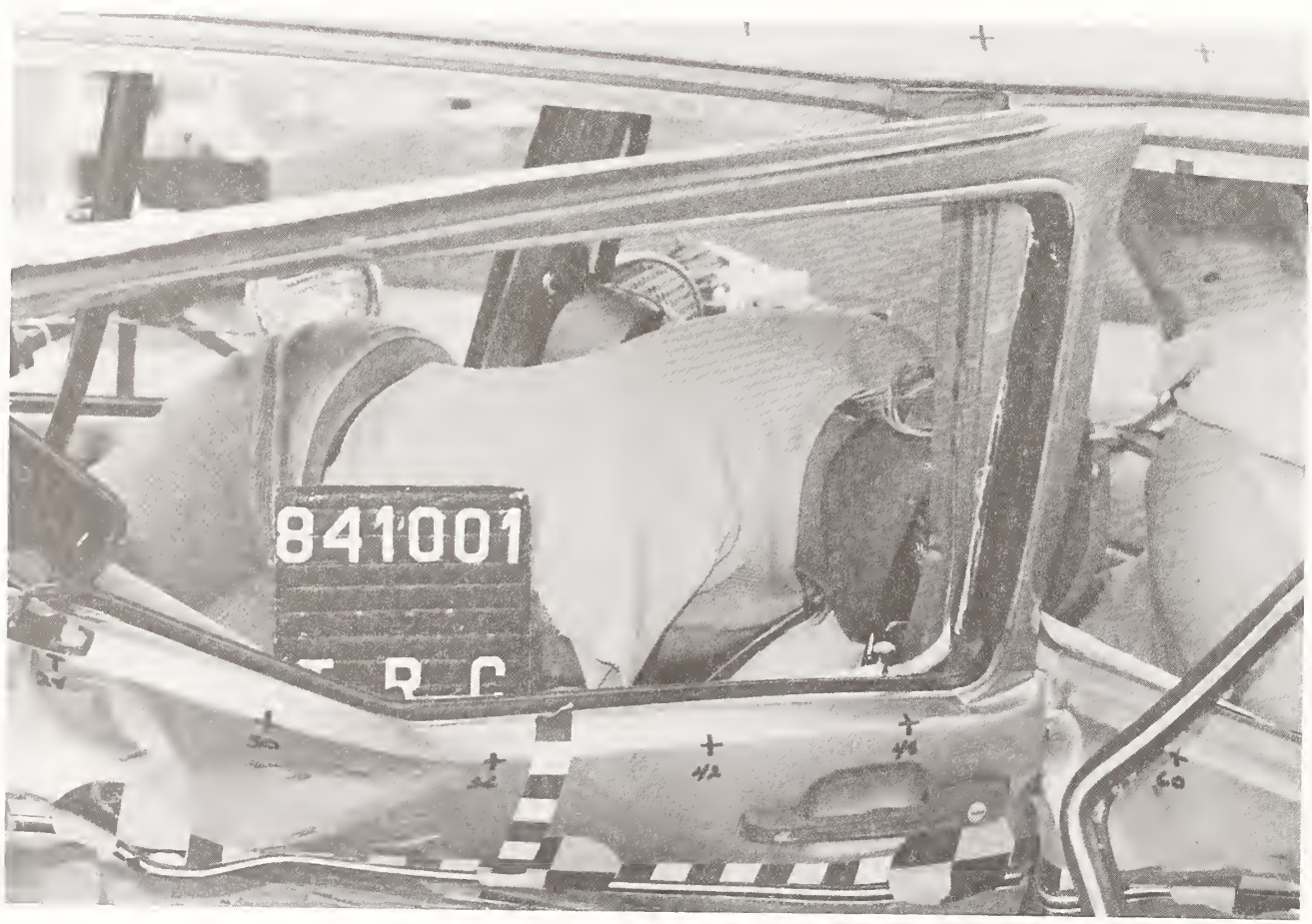


Figure A-18. POST-TEST DRIVER DUMMY - VIEW 1

Figure A-19. POST-TEST DRIVER DUMMY - VIEW 2

Figure A-20. POST-TEST PASSENGER DUMMY - VIEW 1

Figure A-21. POST-TEST PASSENGER DUMMY - VIEW 2

Figure A-22. POST-TEST VEHICLE DAMAGE - VIEW 1

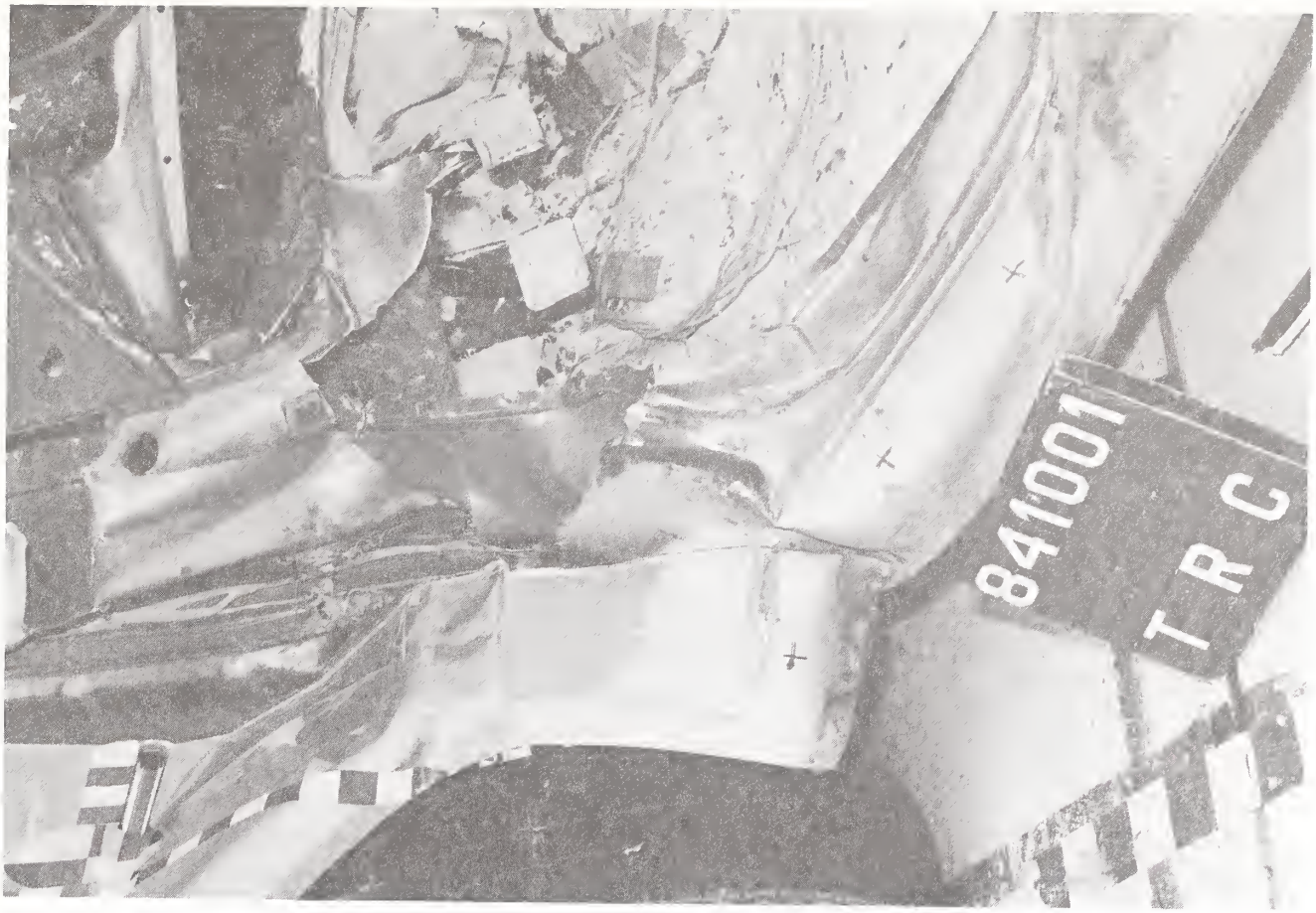


Figure A-23. POST-TEST VEHICLE DAMAGE - VIEW 2

Figure A-24. POST-TEST VEHICLE DAMAGE - VIEW 3

Figure A-25. POST-TEST DUMMIES OVERALL

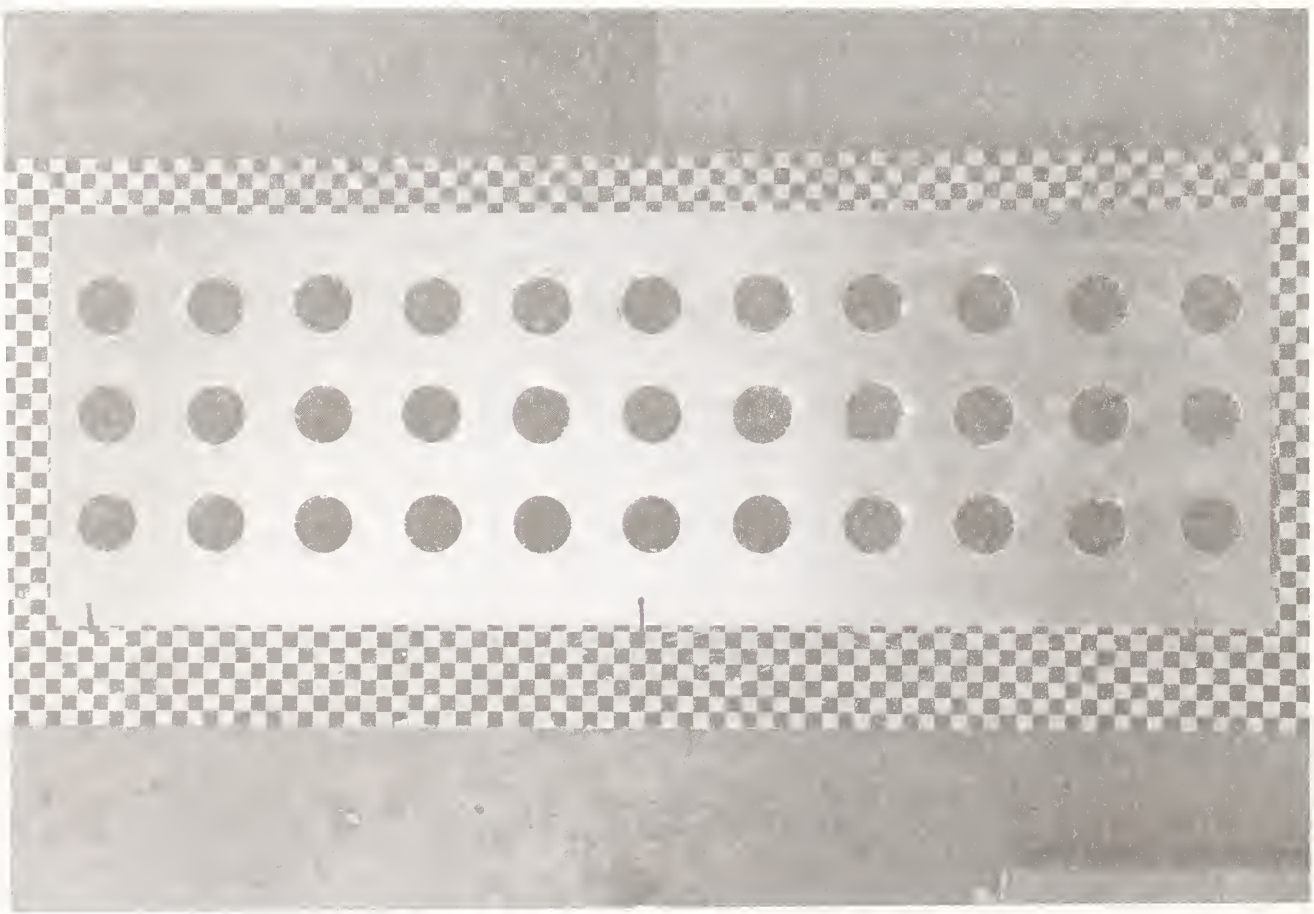


Figure A-26. PRE-TEST MDB FACE - VIEW 1

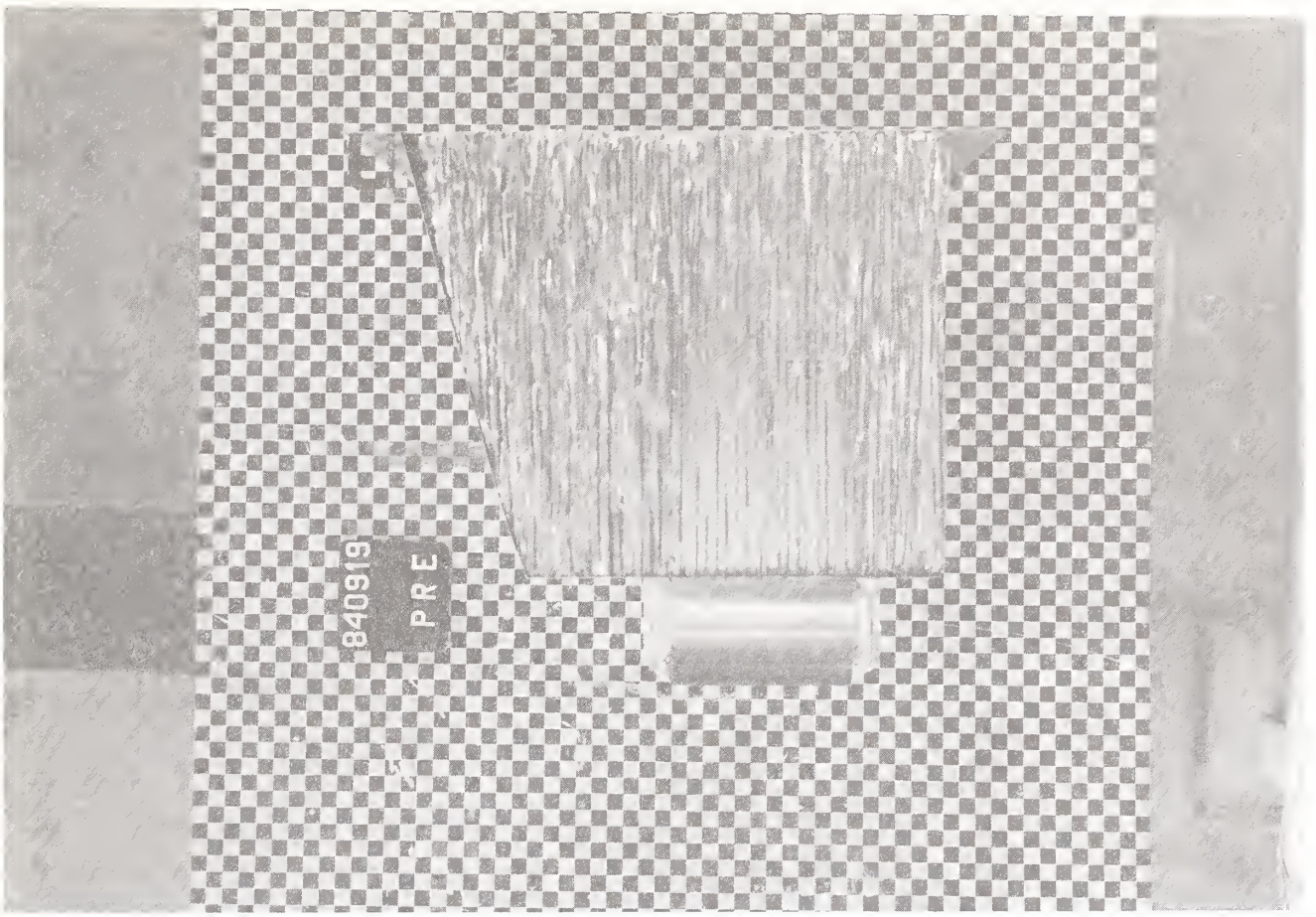


Figure A-27. PRE-TEST MDB FACE - VIEW 2

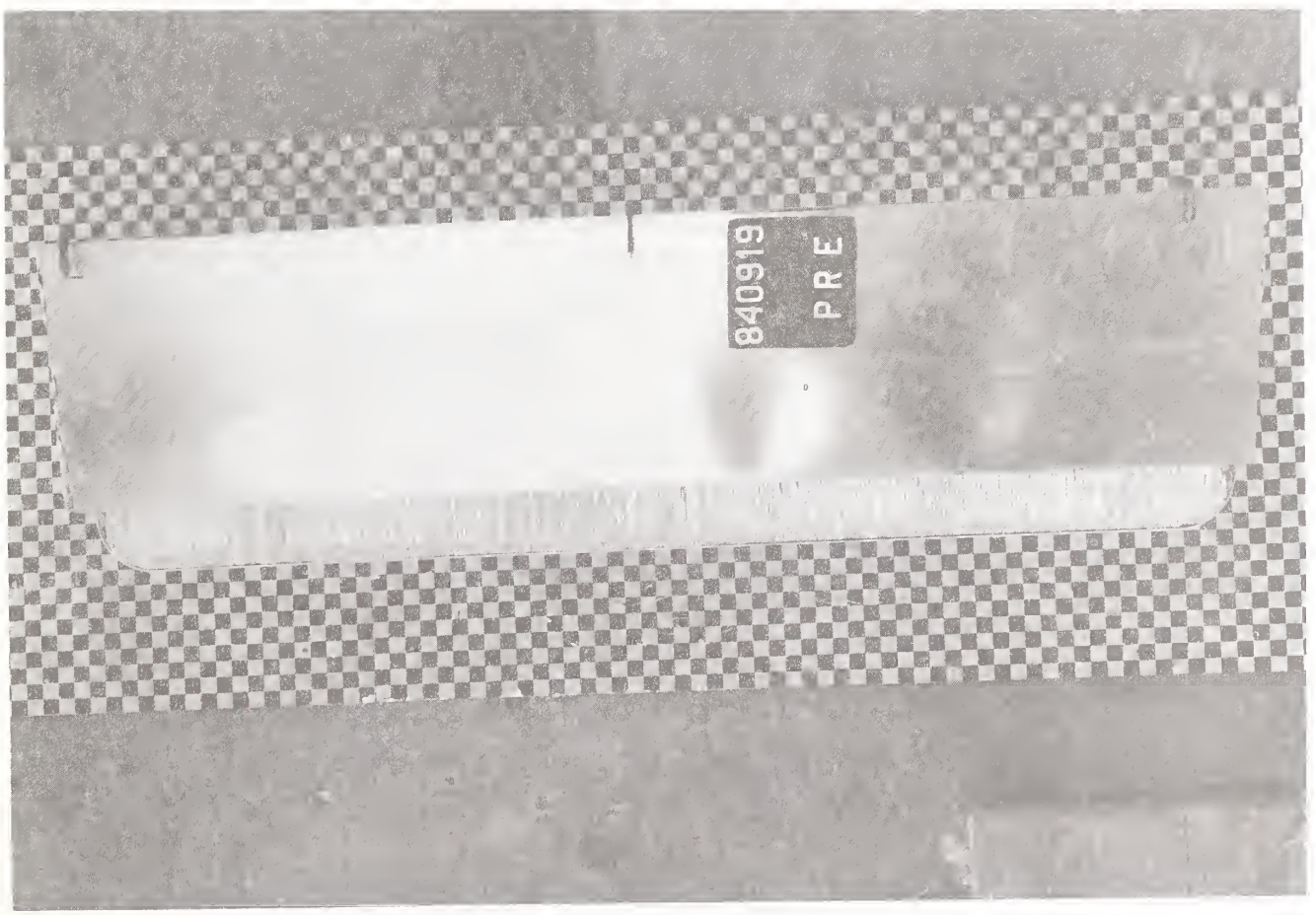


Figure A-28. PRE-TEST MDB FACE - VIEW 3

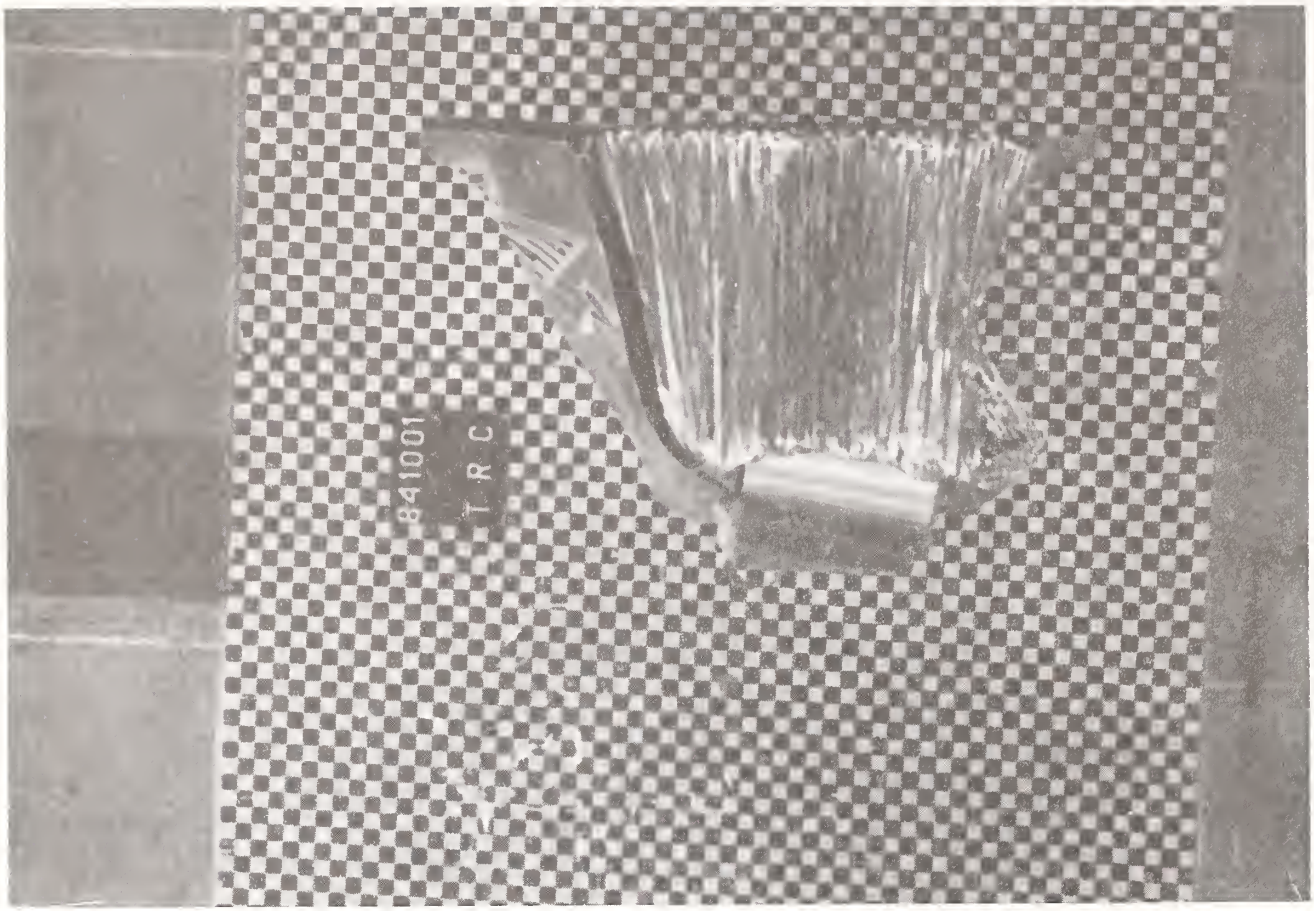


Figure A-29. POST-TEST MDB FACE - VIEW 1

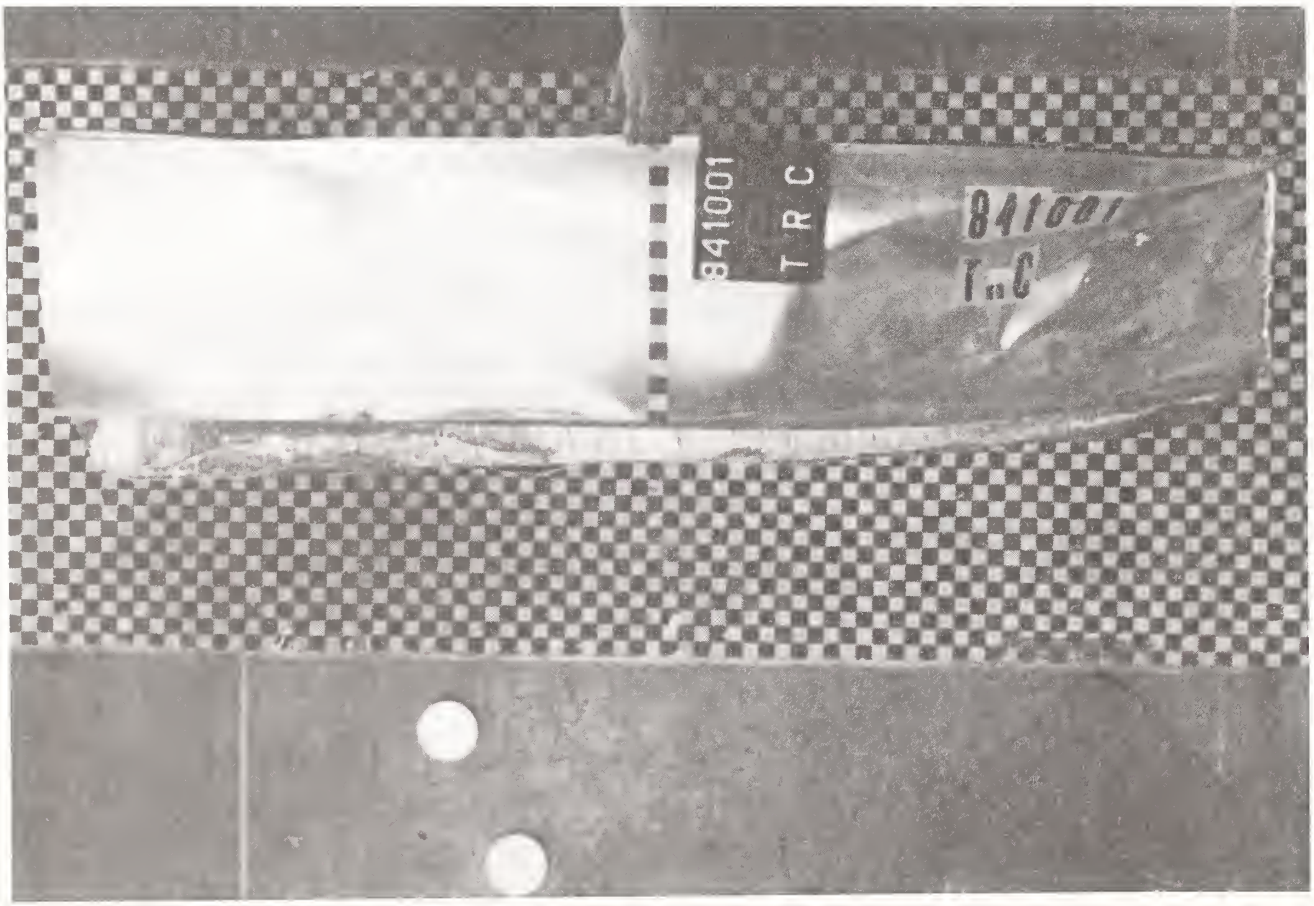


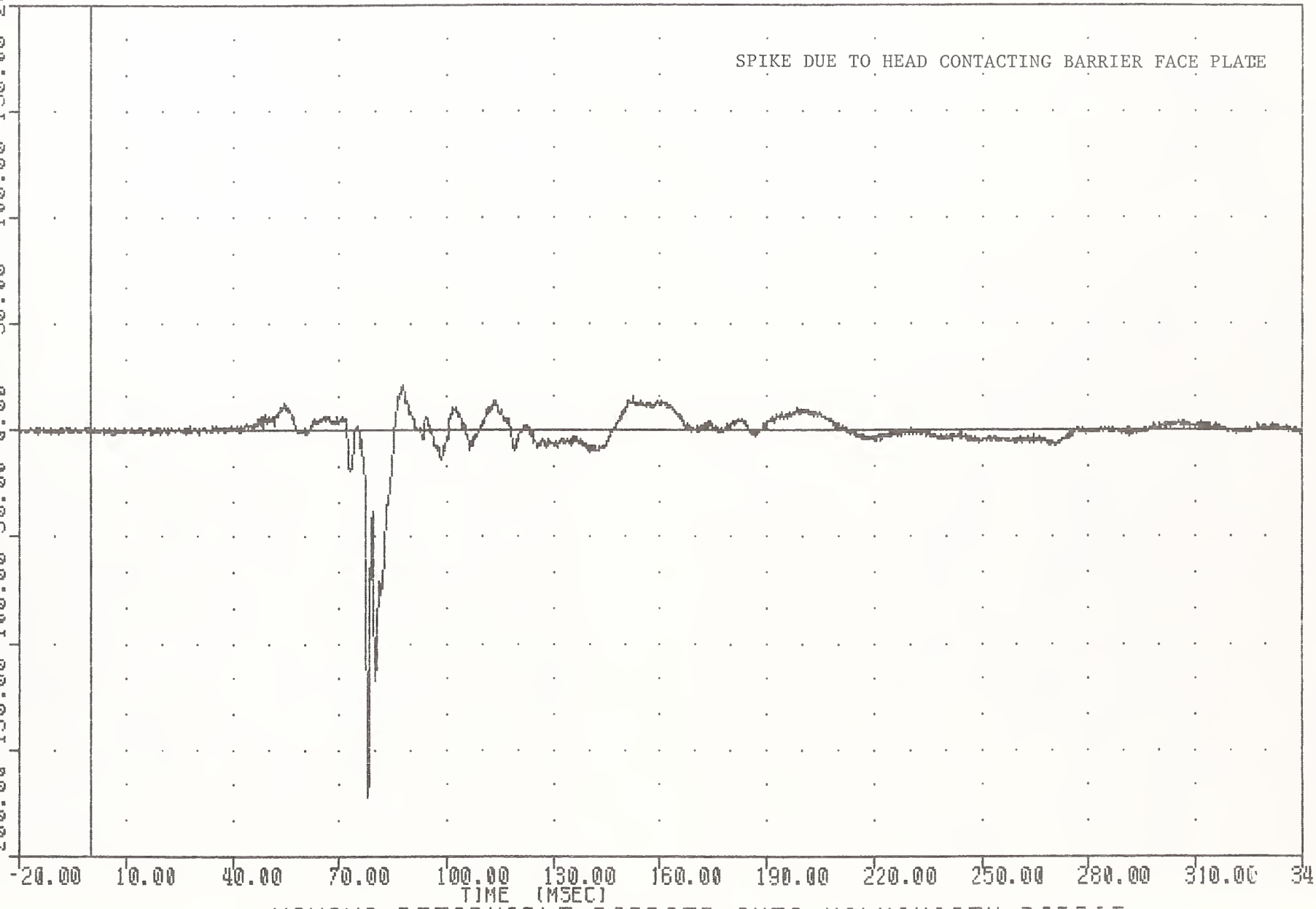
Figure A-30. POST-TEST MDB FACE - VIEW 2

APPENDIX B

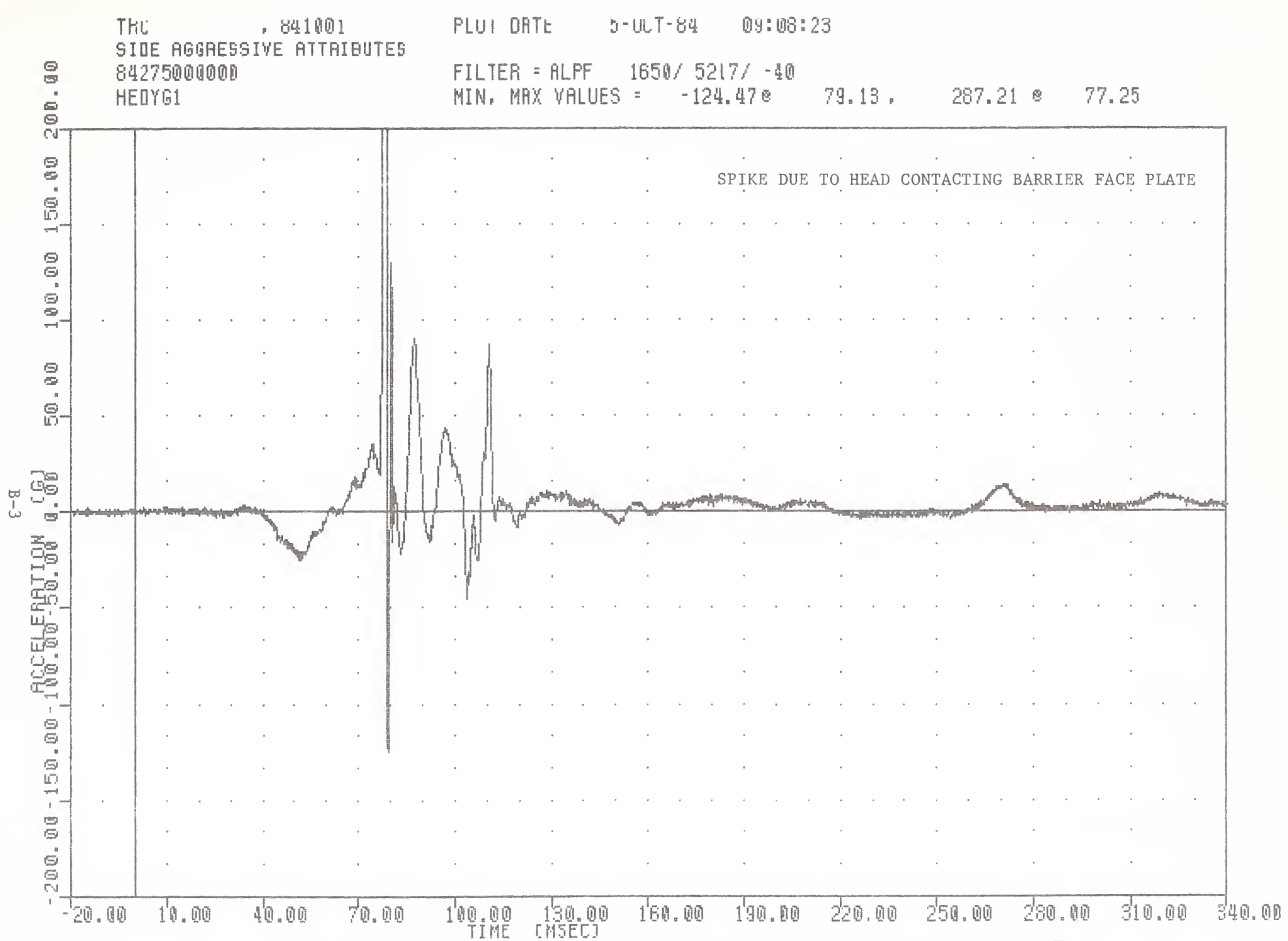
DATA PLOT PRESENTATION

Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. The data was filtered according to SAE J211, except dummy thorax data which was filtered using the HSRI filter.

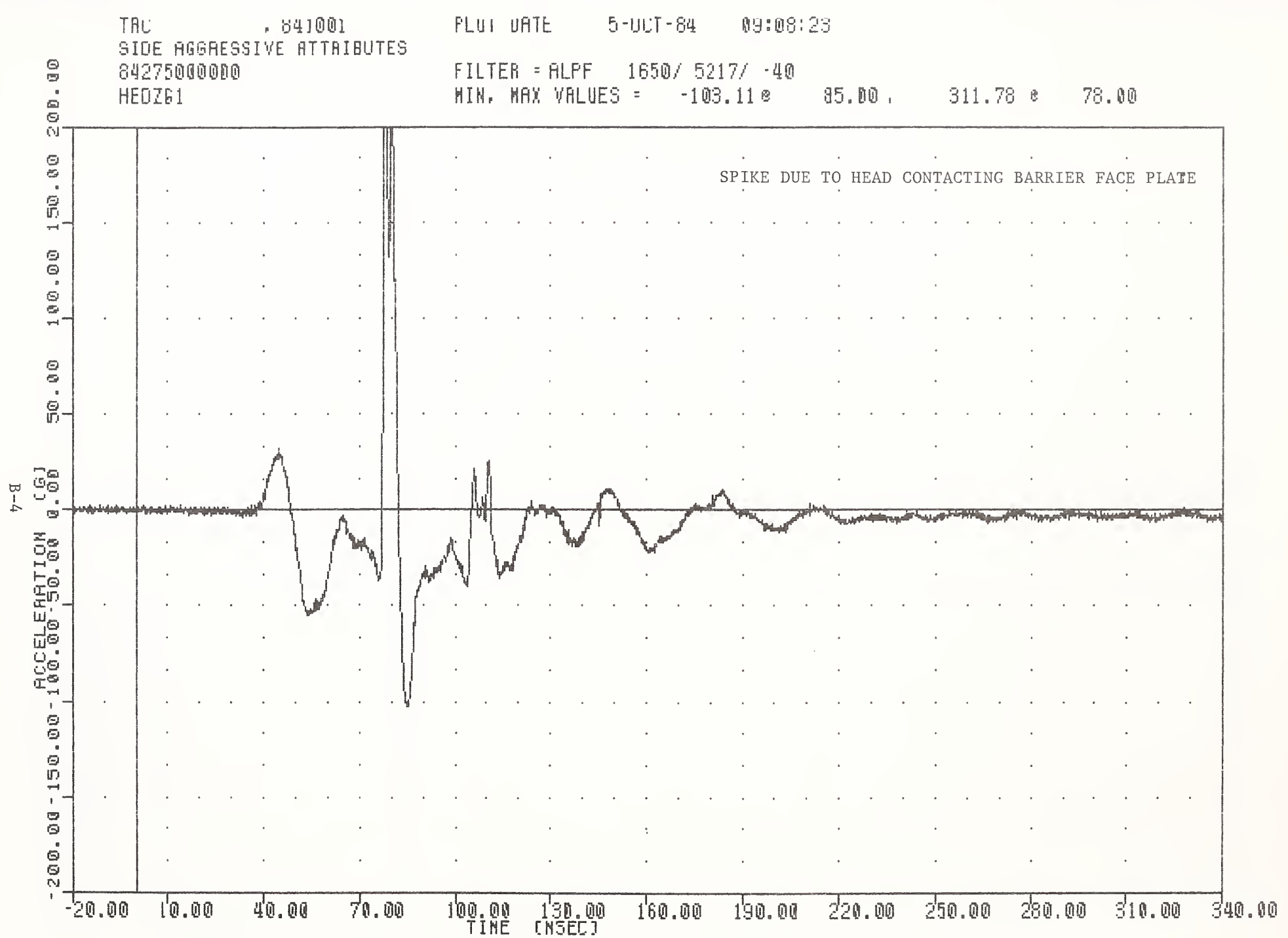
TRC , 841001 PLOT DATE 5-OCT-84 09:08:23
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = ALPF 1650/ 5217/ -40
HEDXG1 MIN, MAX VALUES = -172.71 @ 77.75 , 21.11 @ 87.63



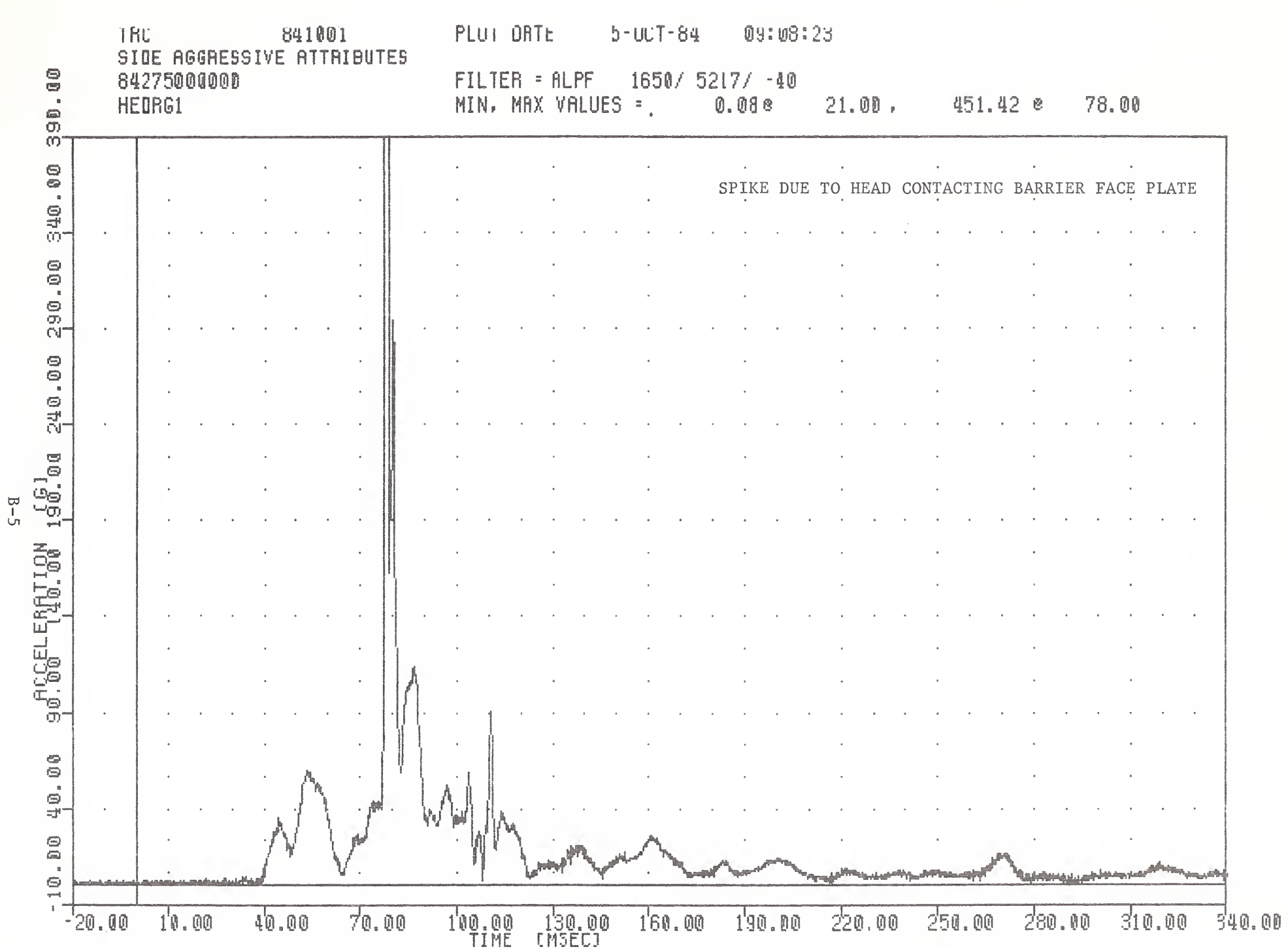
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION X AXIS



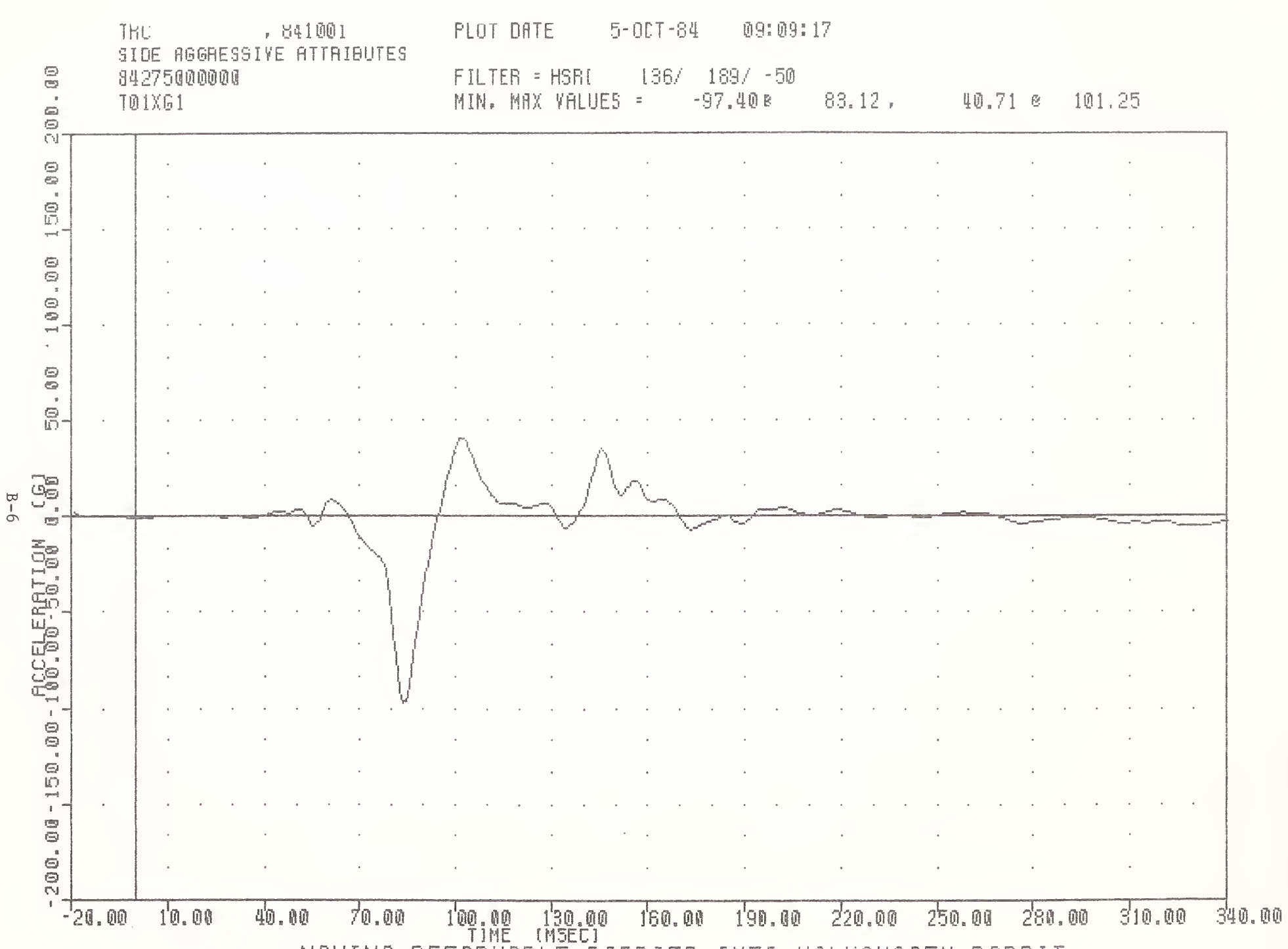
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION Y AXIS



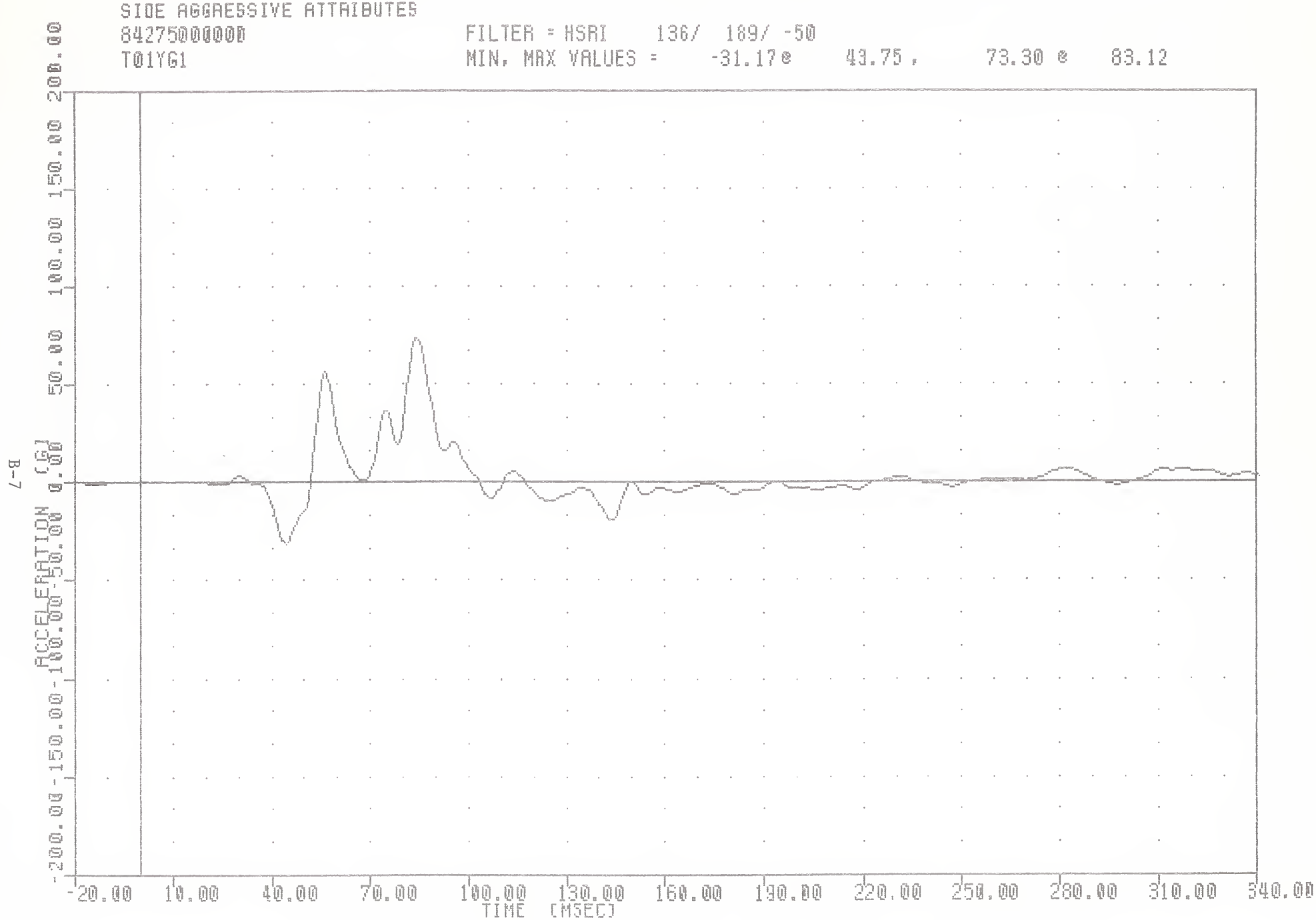
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD ACCELERATION Z AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER HEAD RESULTANT

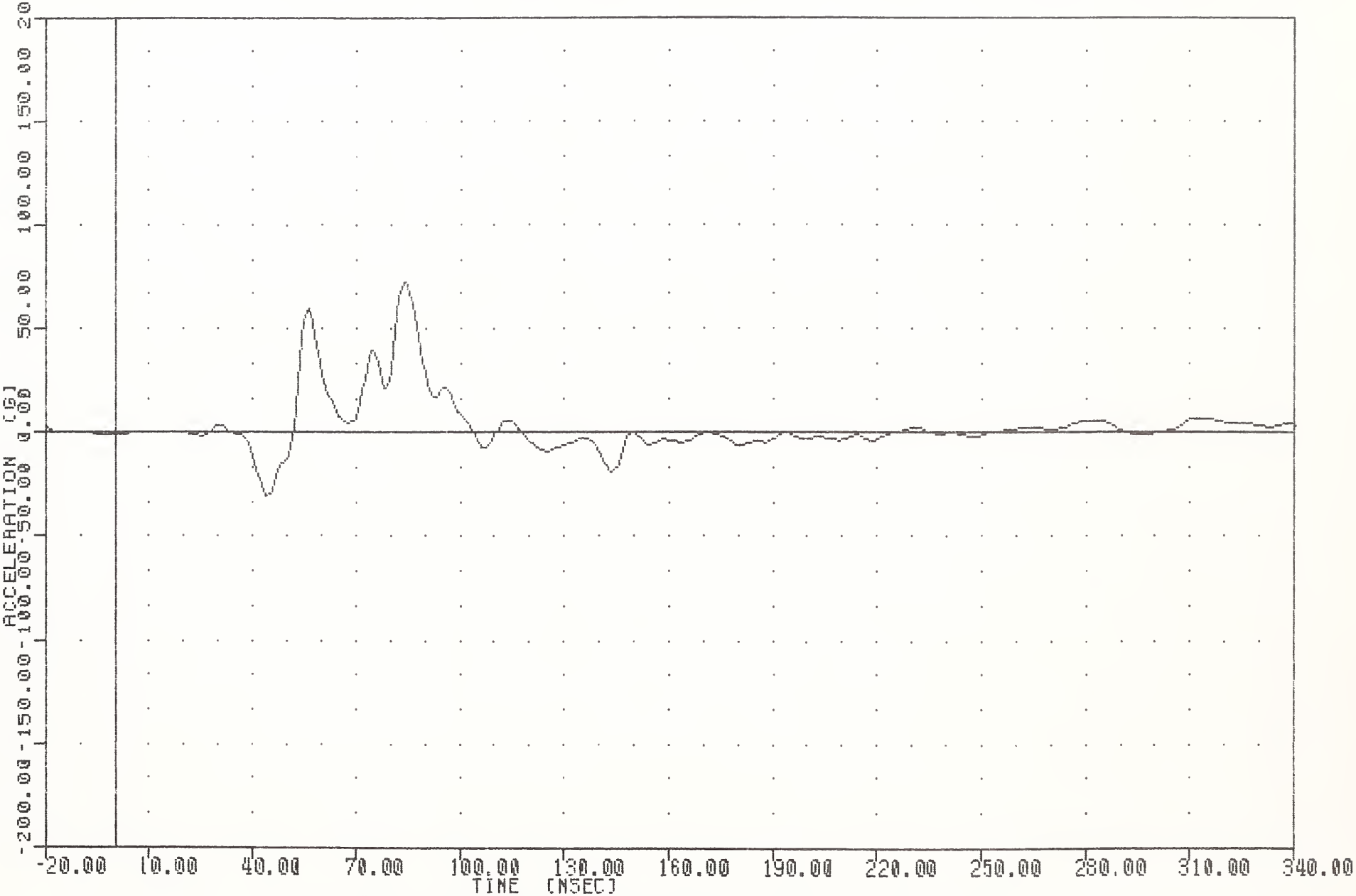


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION X AXIS



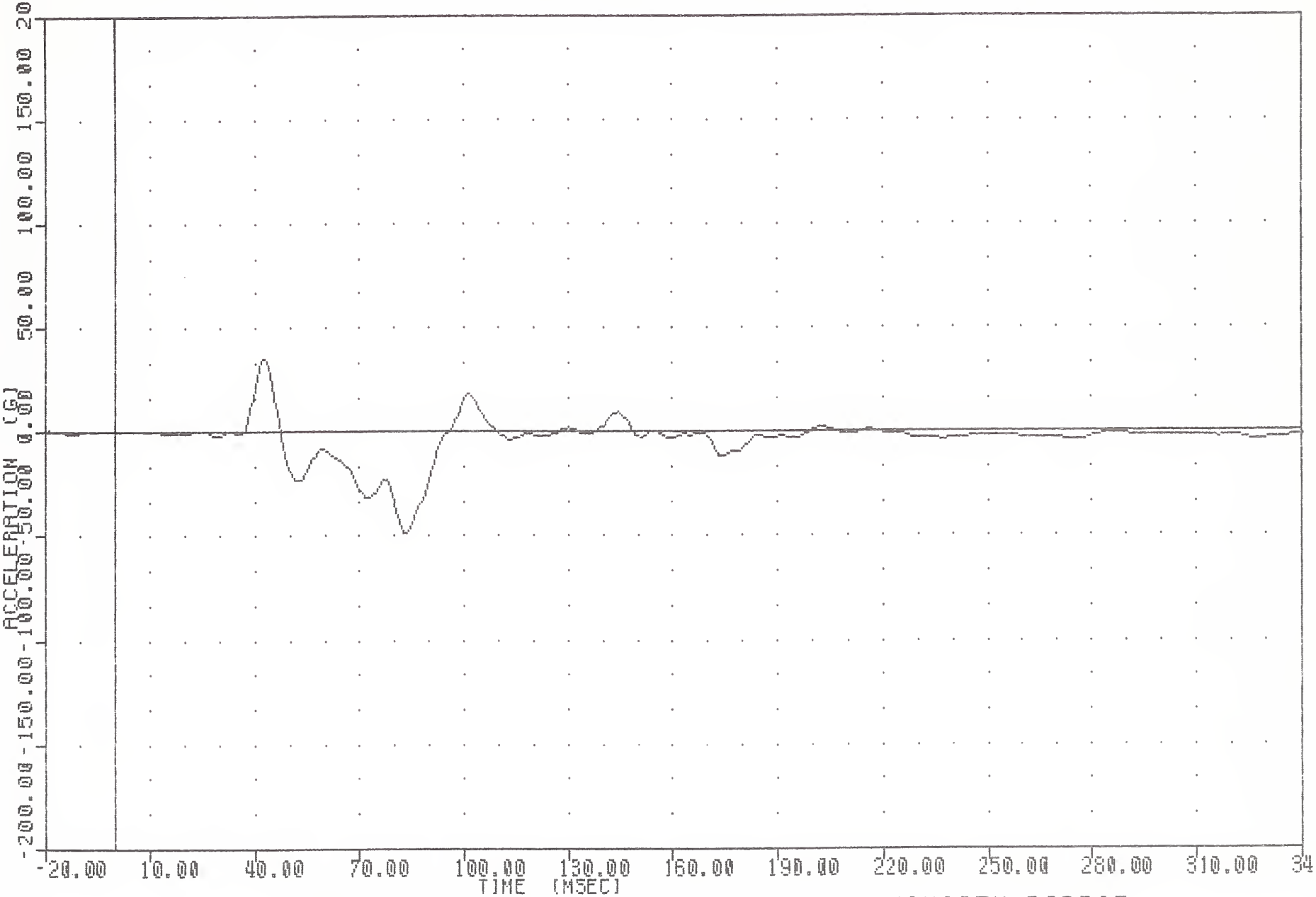
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION Y AXIS

TRC , 841001 PLOT DATE 5-OCT-84 09:09:17
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
T01Y6A MIN, MAX VALUES = -30.54 @ 43.75 , 72.65 @ 83.12

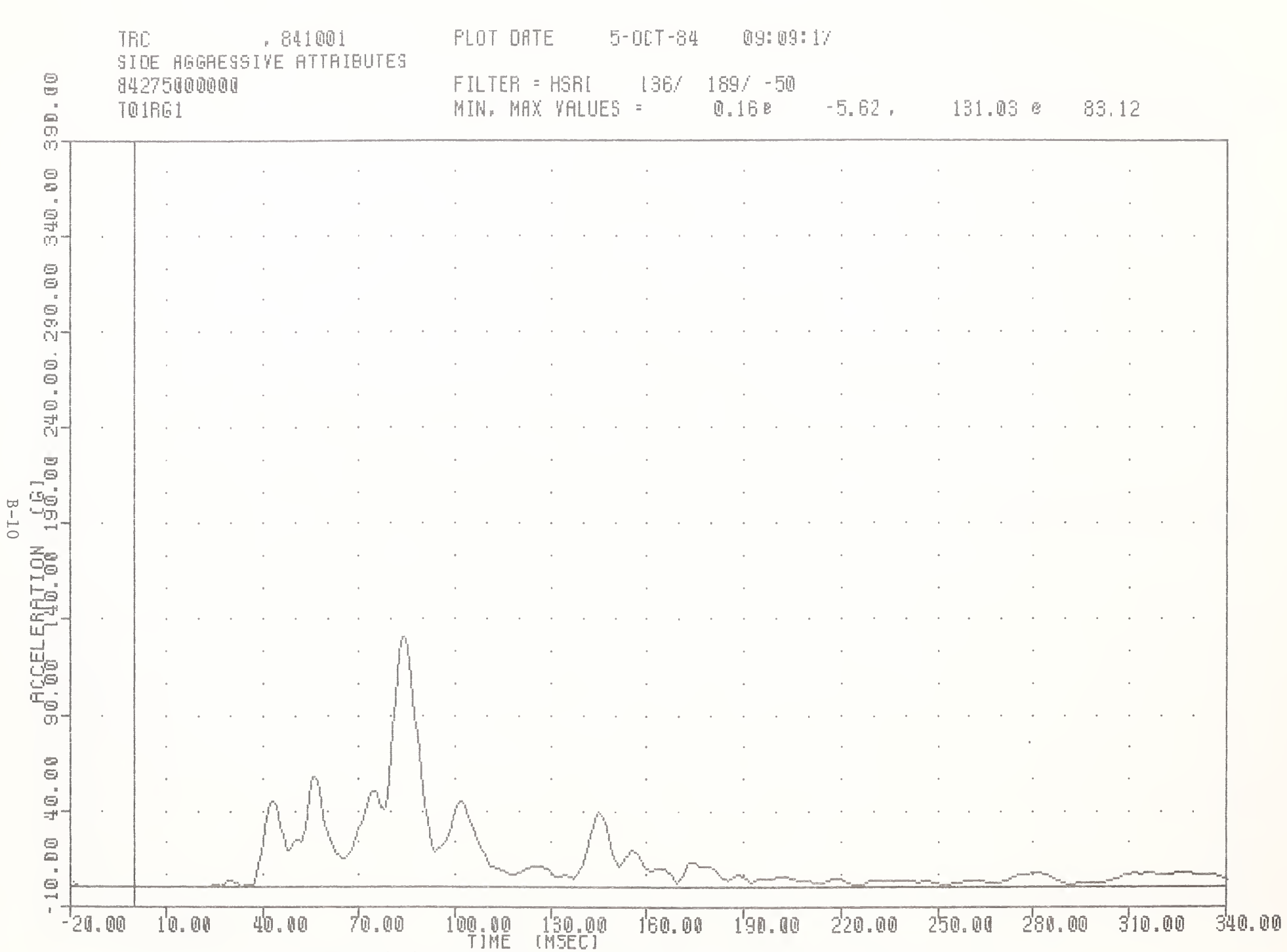


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION -2 Y AXIS

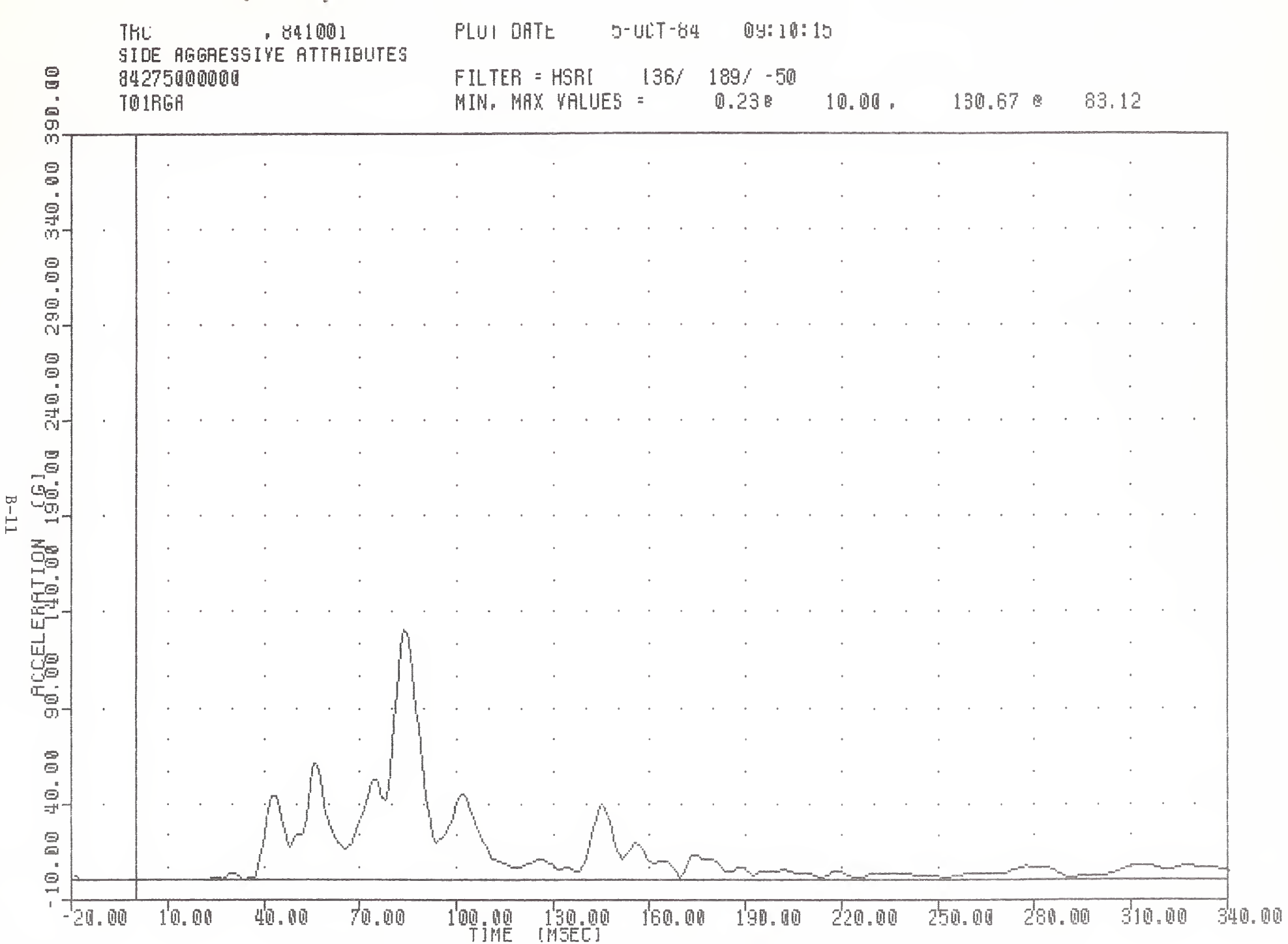
TRC , 841001 PLOT DATE 5-OCT-84 09:09:17
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = HSRI [36/ 189/ -50
T01ZG1 MIN, MAX VALUES = -48.99 @ 82.50 , 34.97 @ 41.87



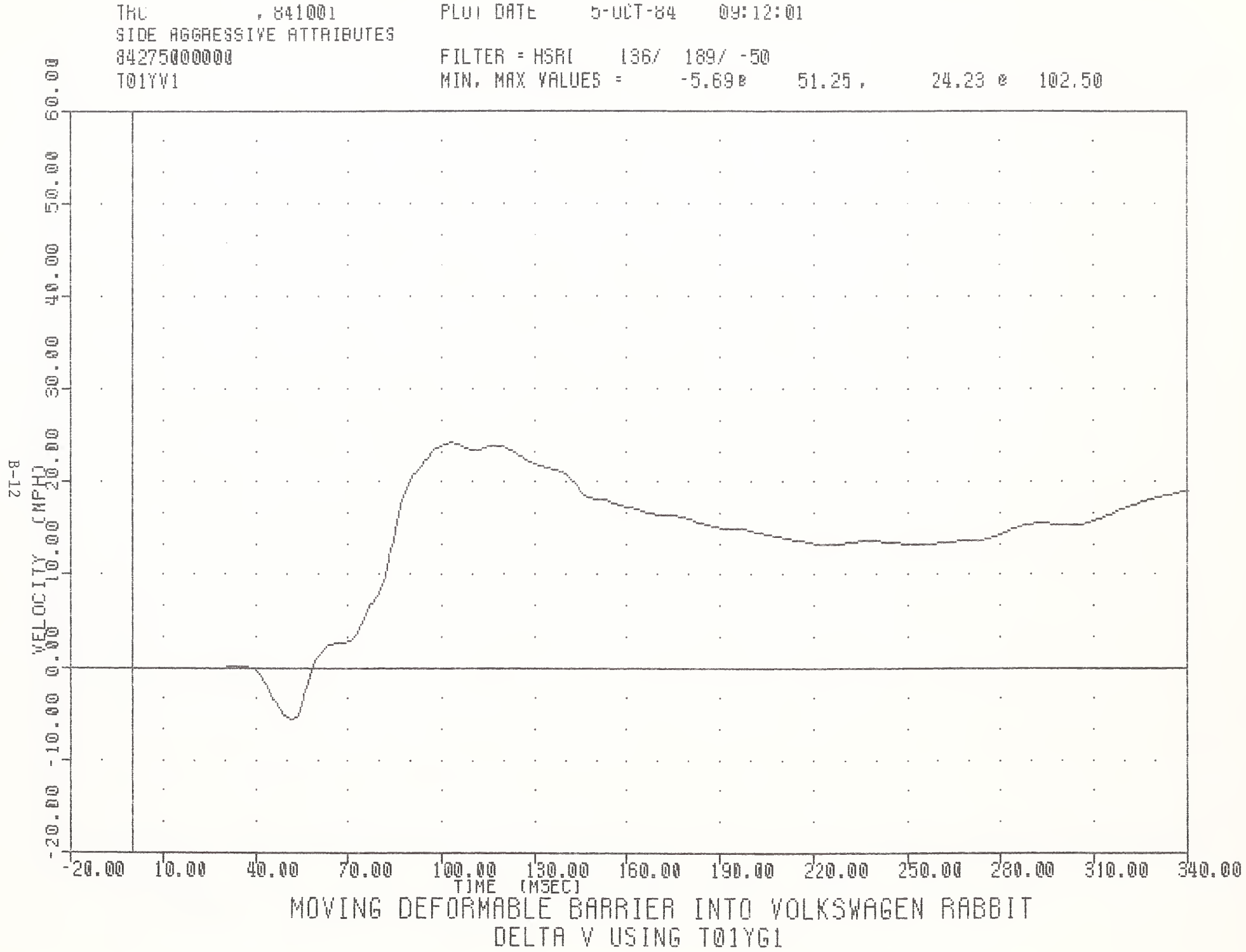
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE ACCELERATION Z AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE RESULTANT

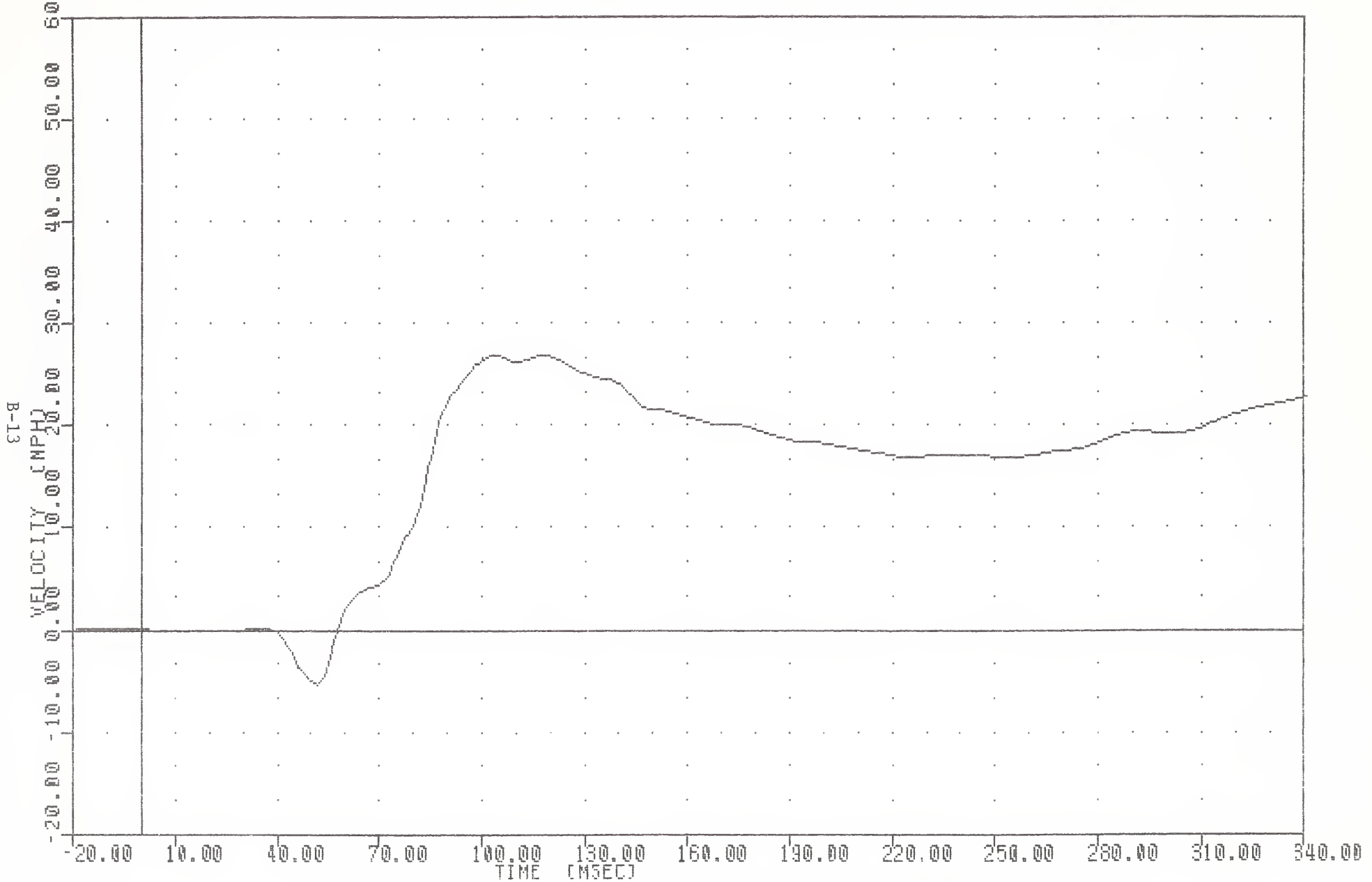


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER UPPER SPINE RESULTANT USING T01YGA

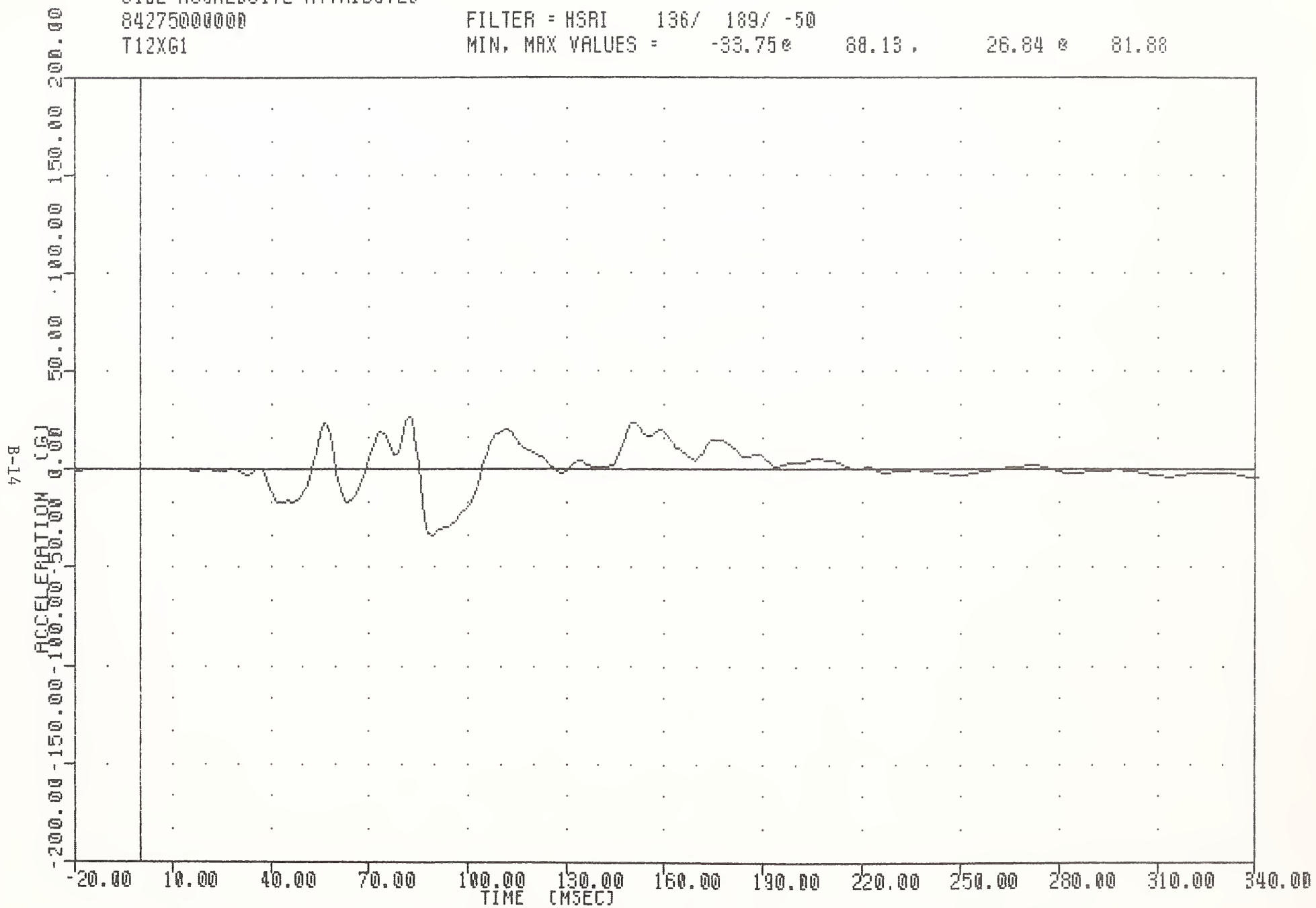


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YG1

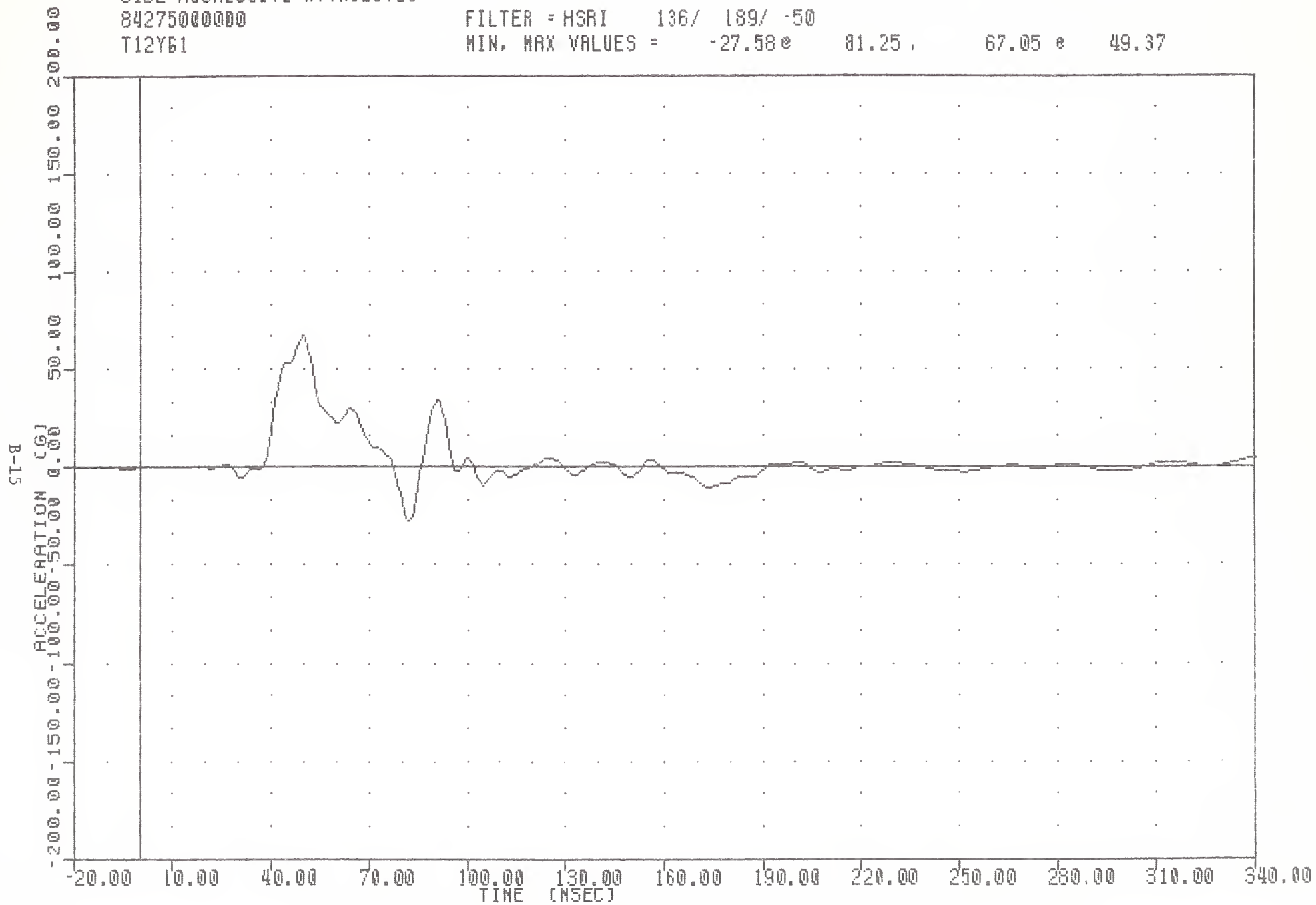
TRC 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = HSRI 136/ 189/ -50
T01YVA MIN, MAX VALUES = -5.32 @ 51.25 , 26.83 @ 103.13



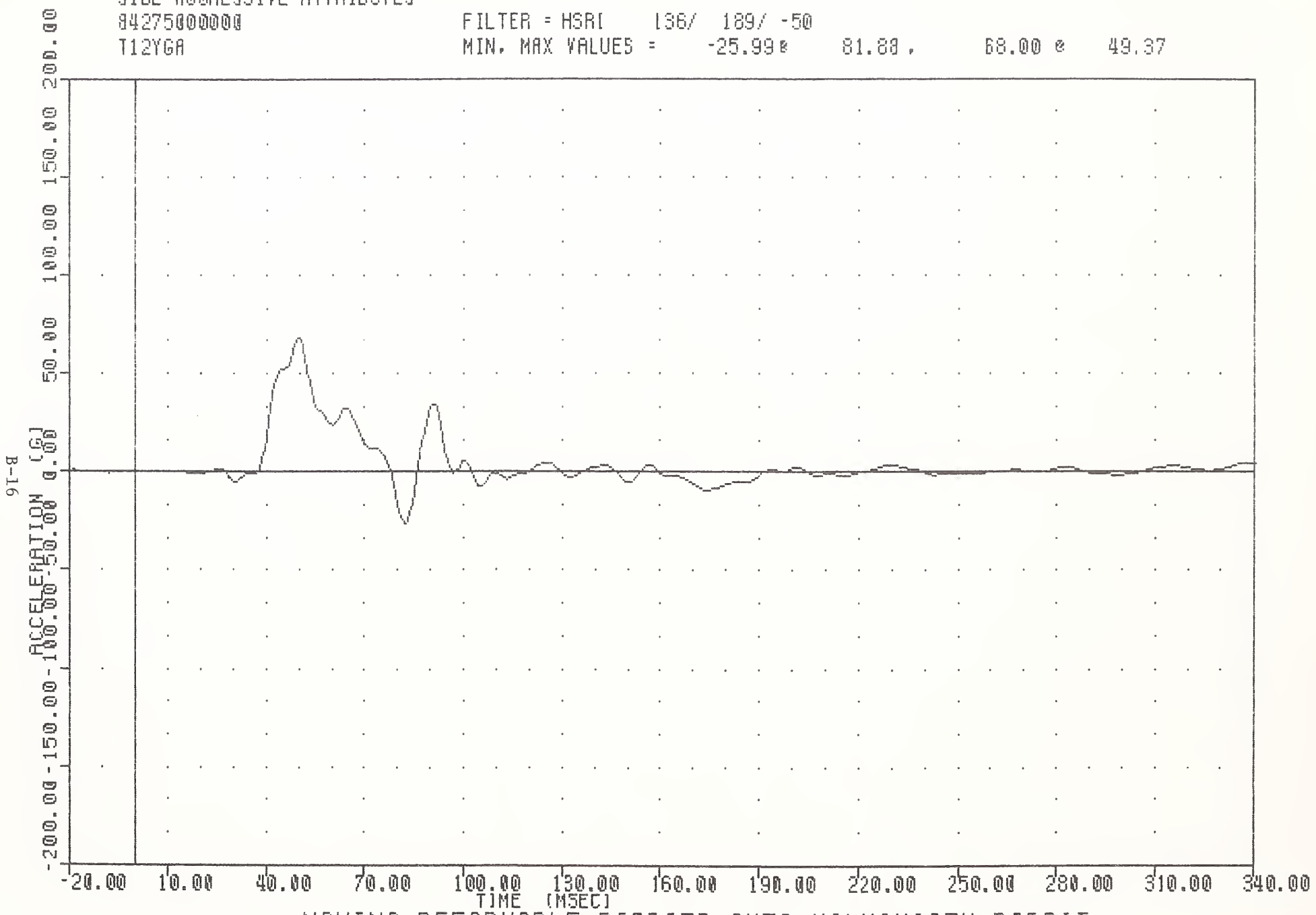
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YGA



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION X AXIS

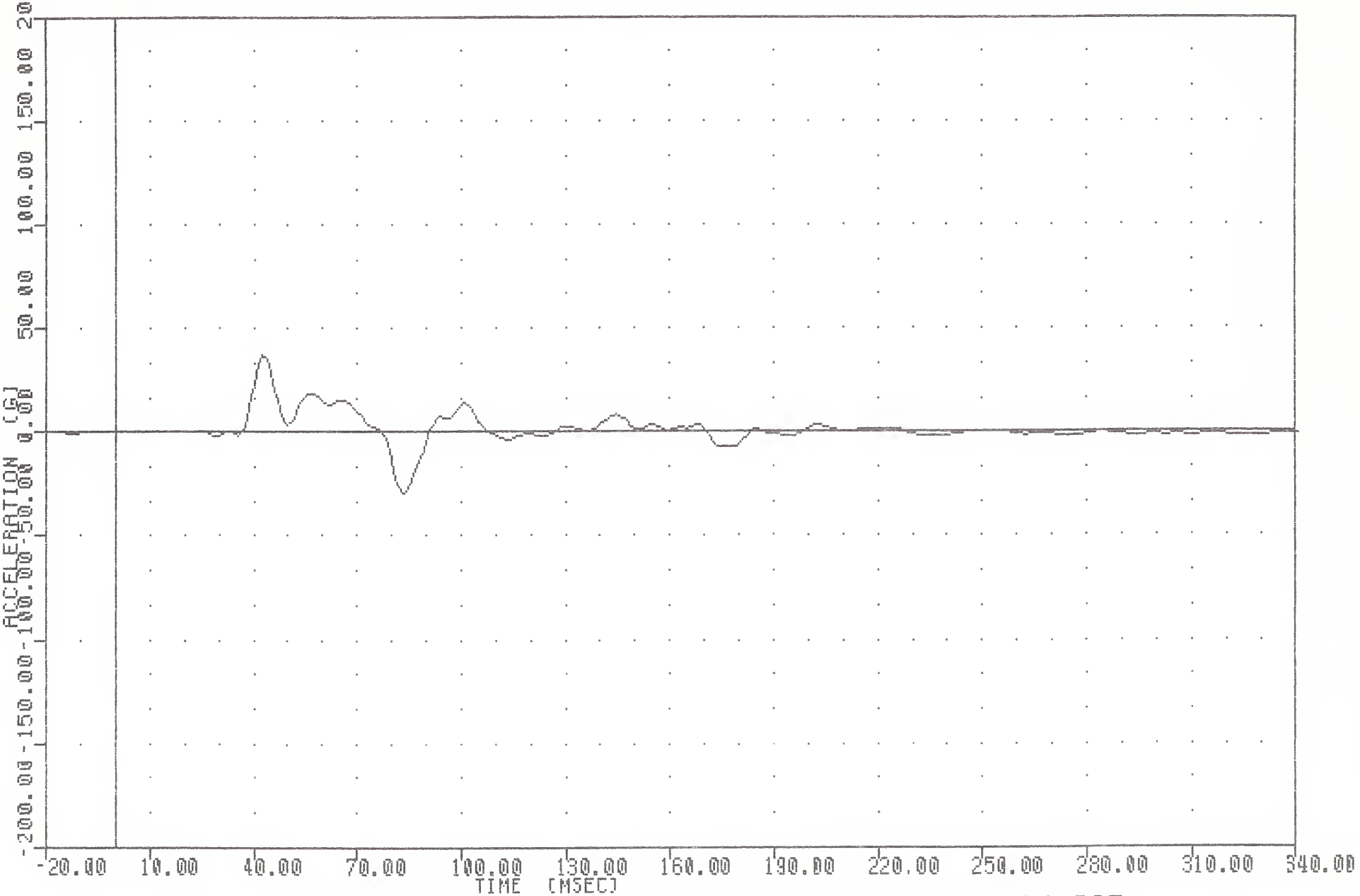


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION Y AXIS

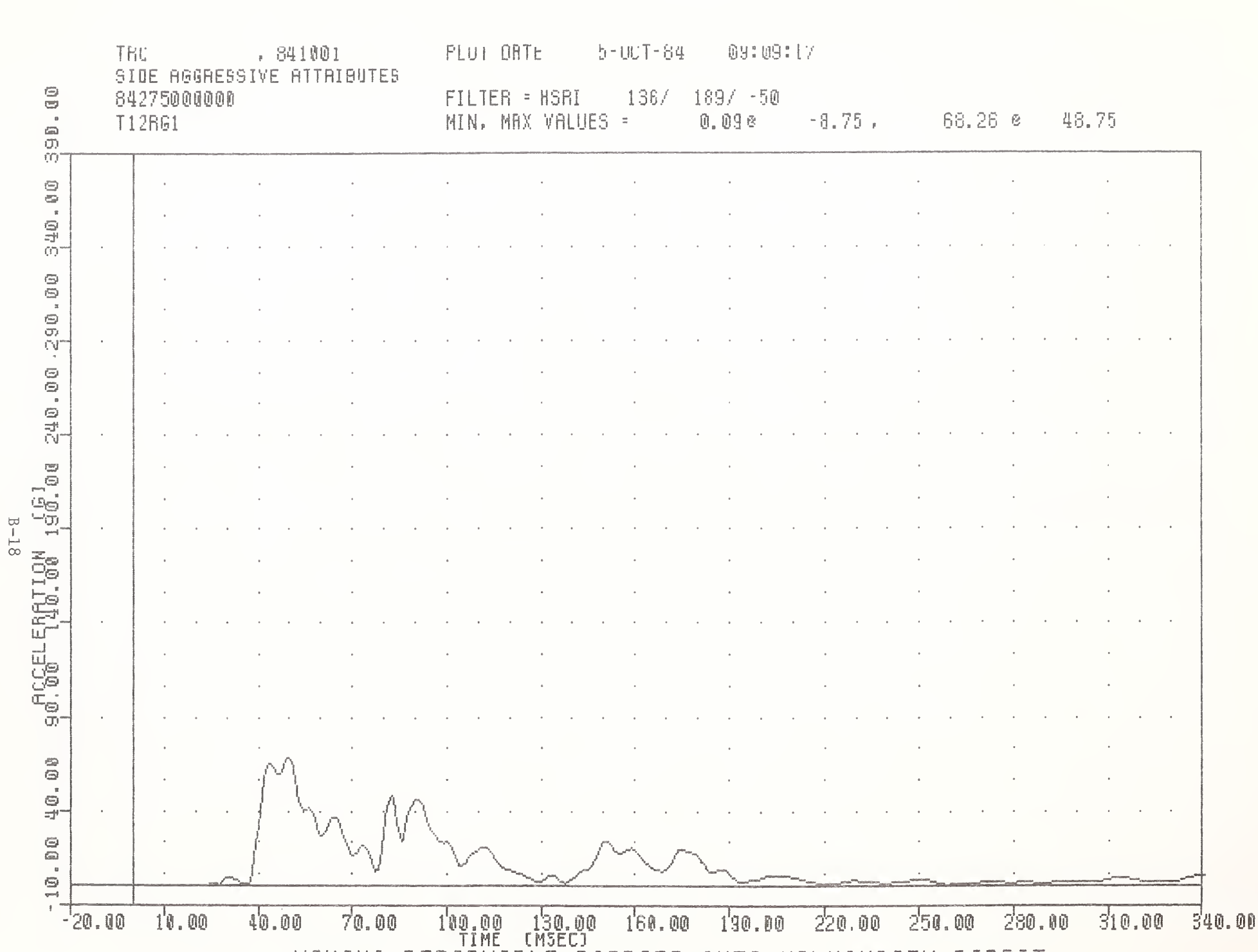


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION -2 Y AXIS

TRC , 841001 PLOT DATE 5-OCT-84 09:09:17
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
T12ZG1 MIN. MAX VALUES = -29.84 @ 82.50 , 36.93 @ 41.87

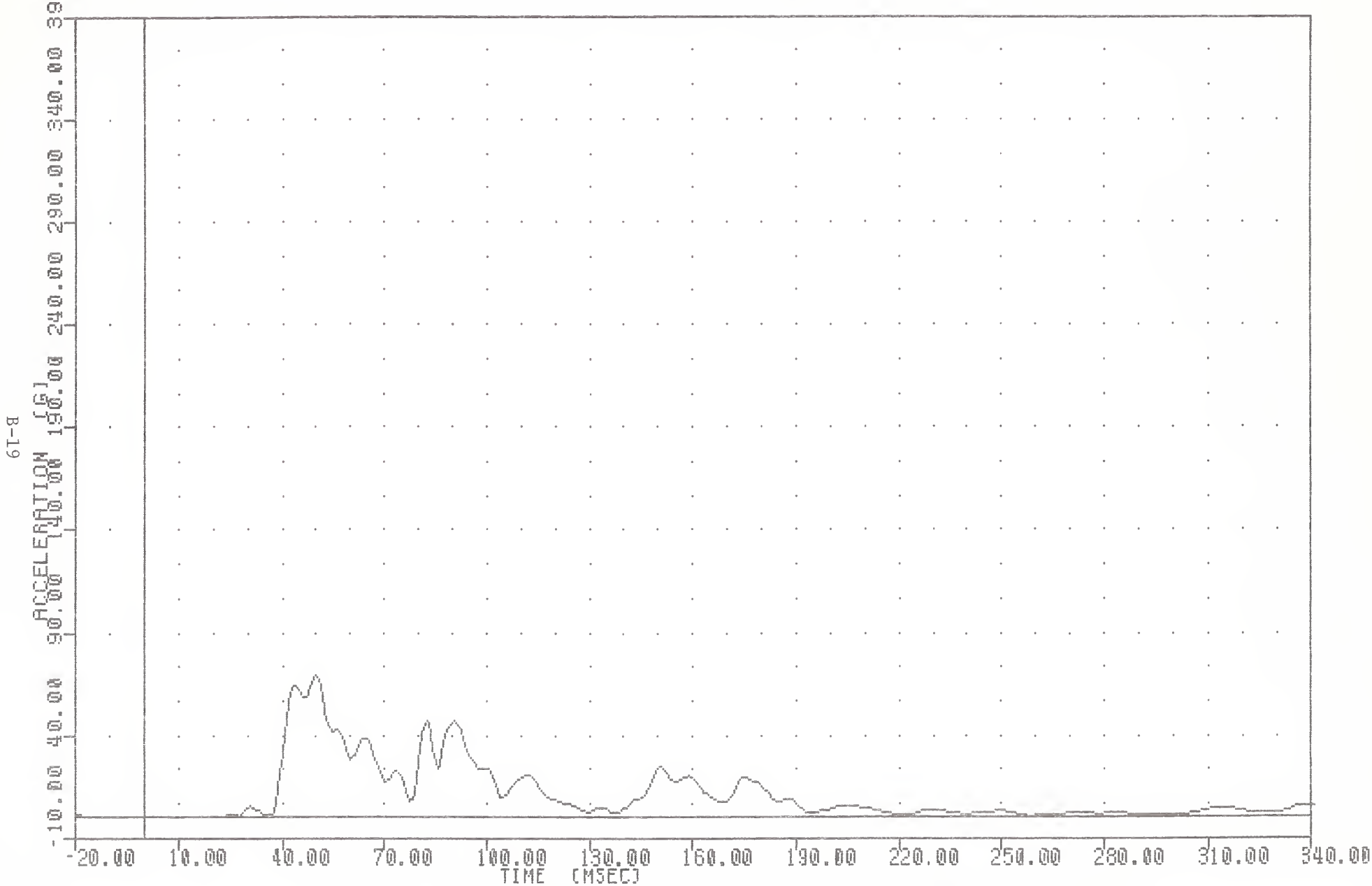


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE ACCELERATION Z AXIS



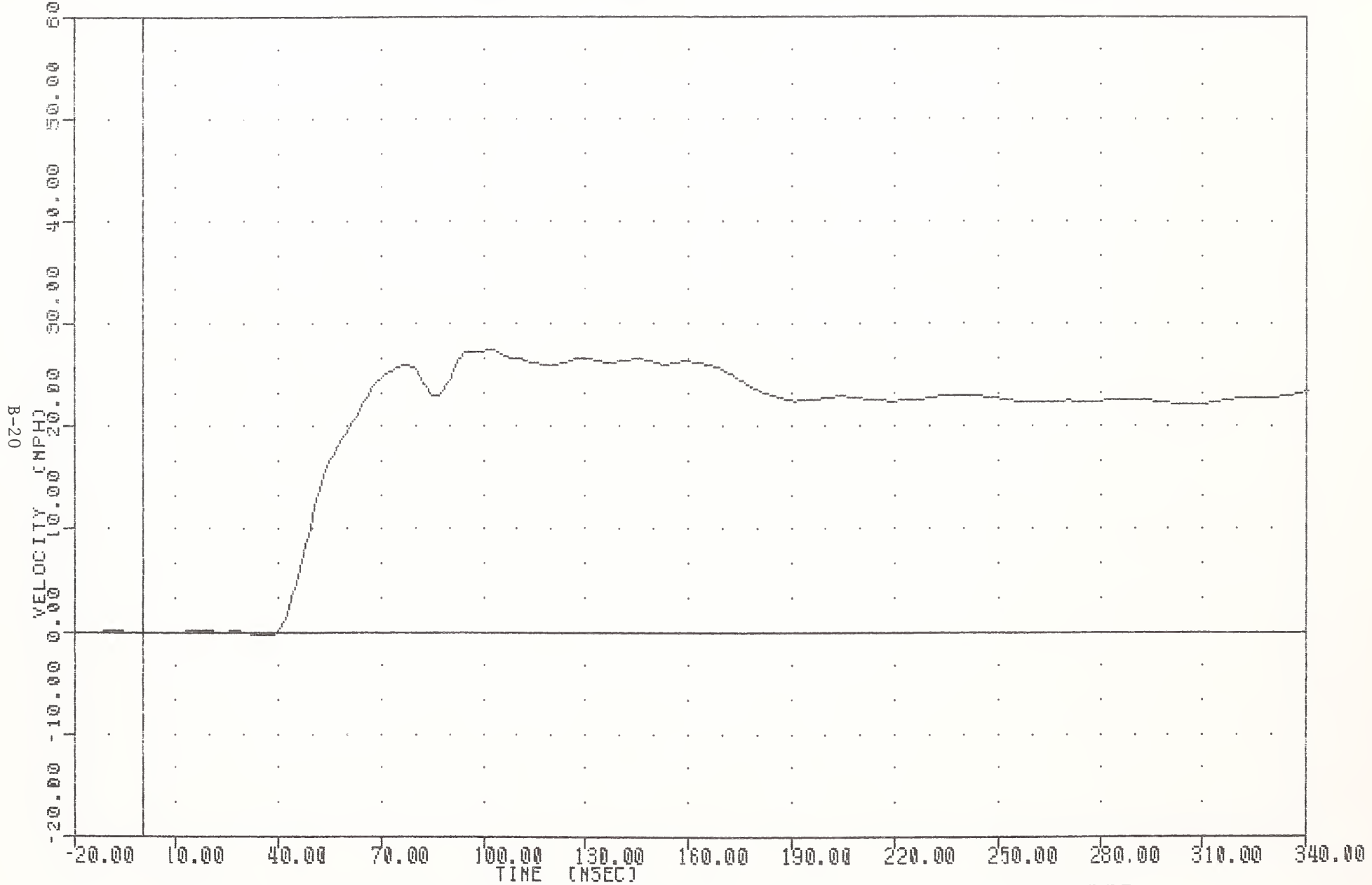
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE RESULTANT

TRC , 841001 PLOT DATE 5-OCT-84 09:10:15
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
T12RGA MIN, MAX VALUES = 0.05@ 3.75 , 69.06 @ 49.37

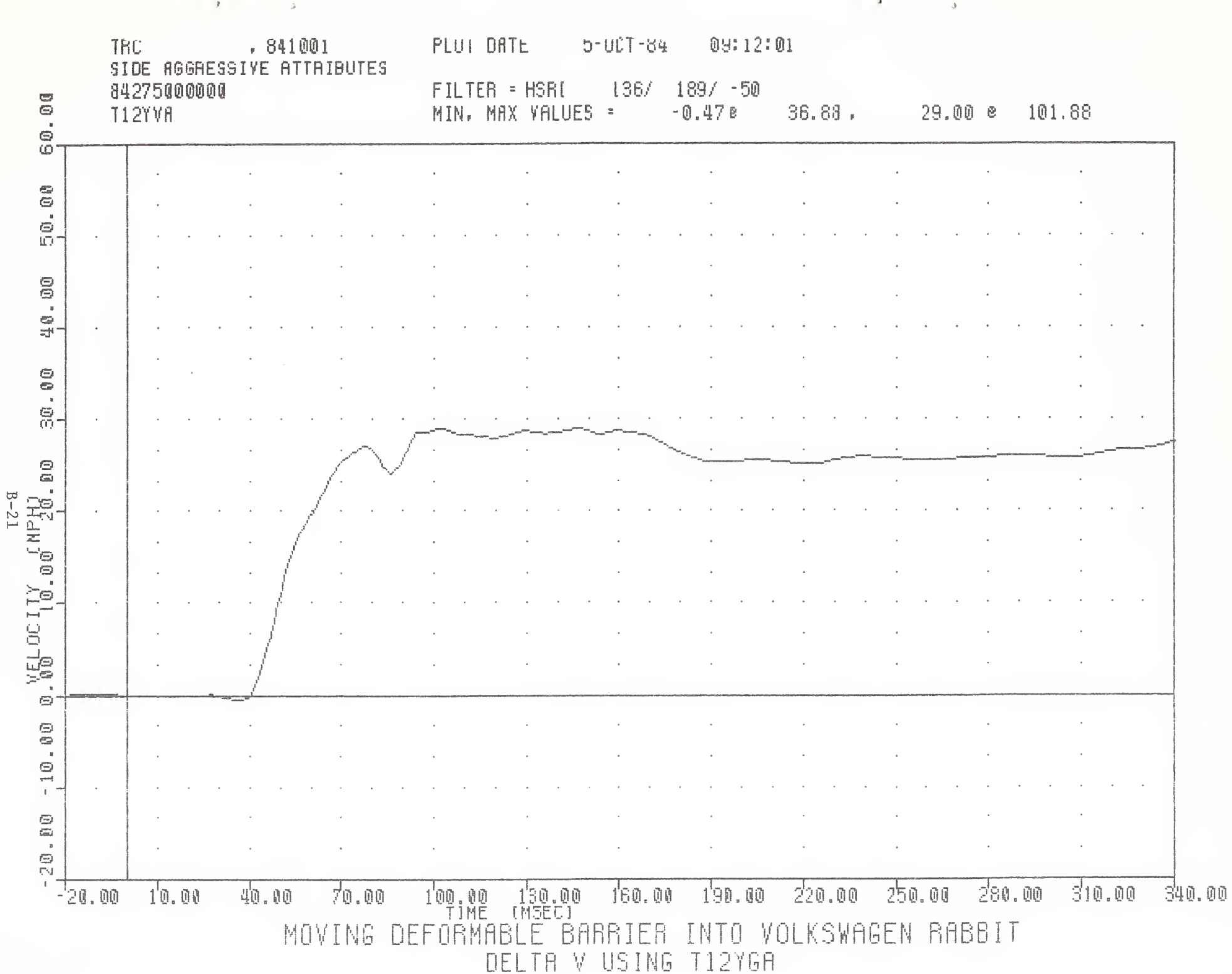


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LOWER SPINE RESULTANT USING T12YGA

TAC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = HSRI 136/ 189/ -50
T12YV1 MIN. MAX VALUES = -0.41 @ 36.25 , 27.48 @ 101.25

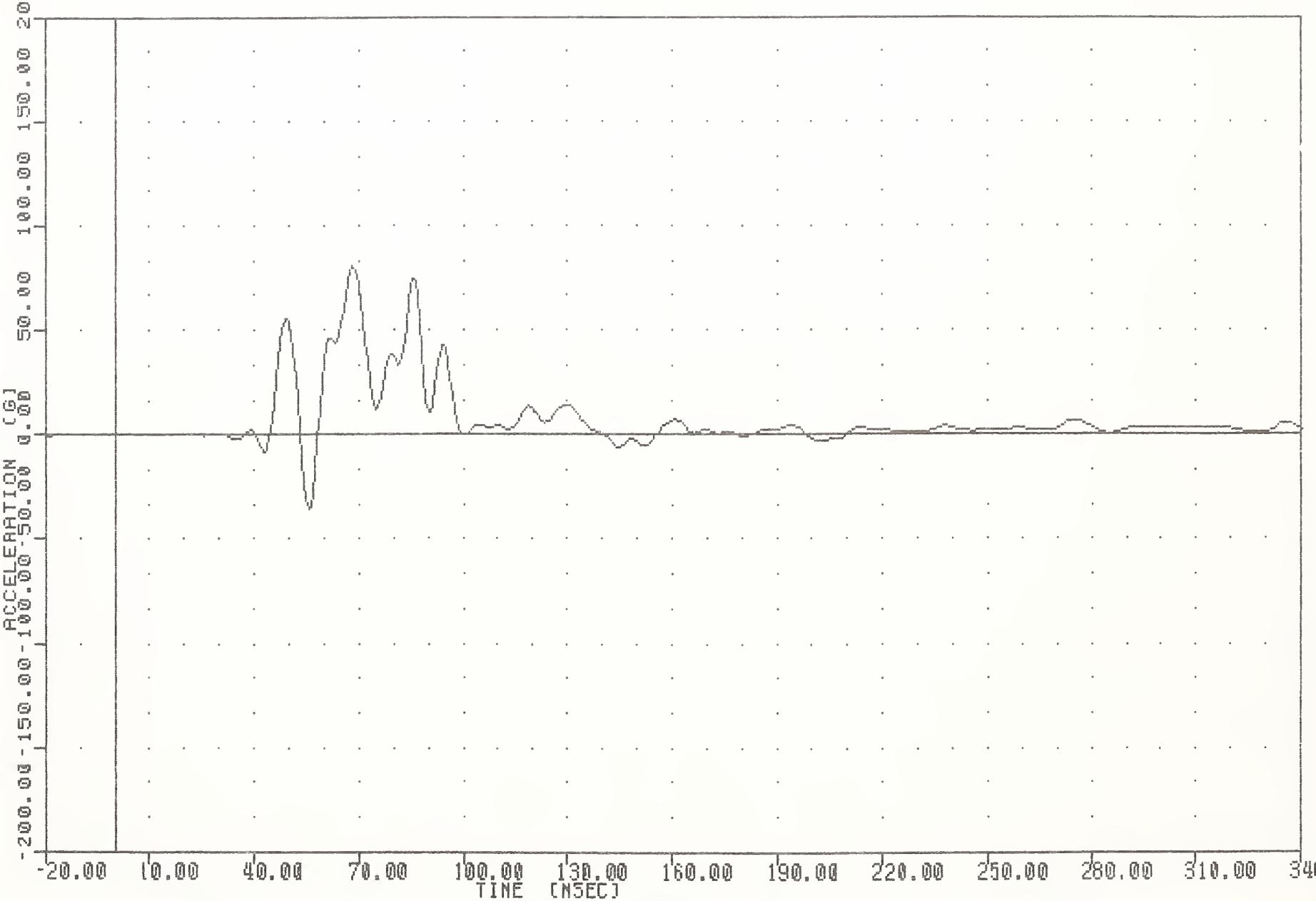


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YG1



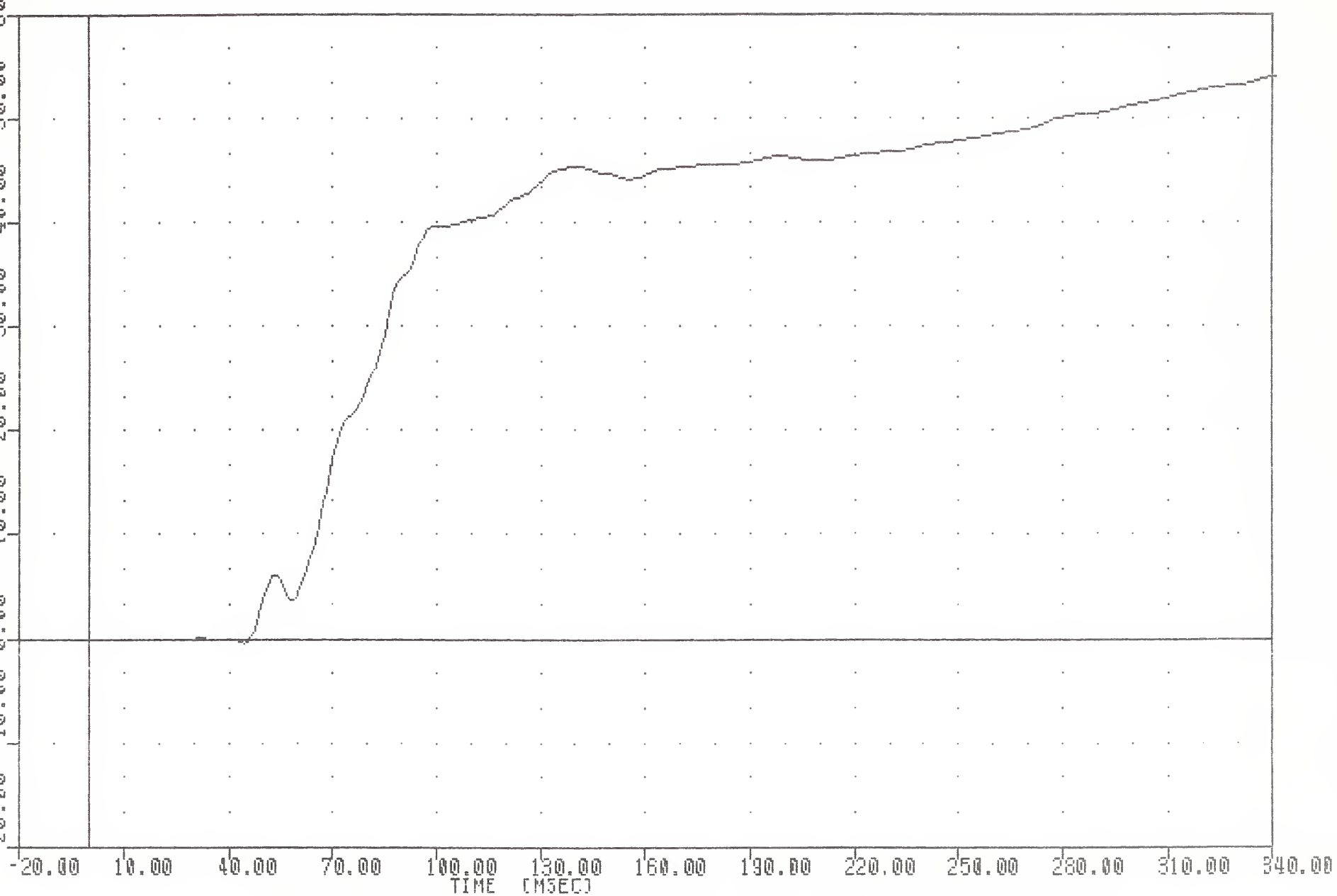
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YGA

TRC , 841001 PLOT DATE 5-OCT-84 09:09:17
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
LURY61 MIN, MAX VALUES = -35.52 @ 55.00 , 80.66 @ 67.50

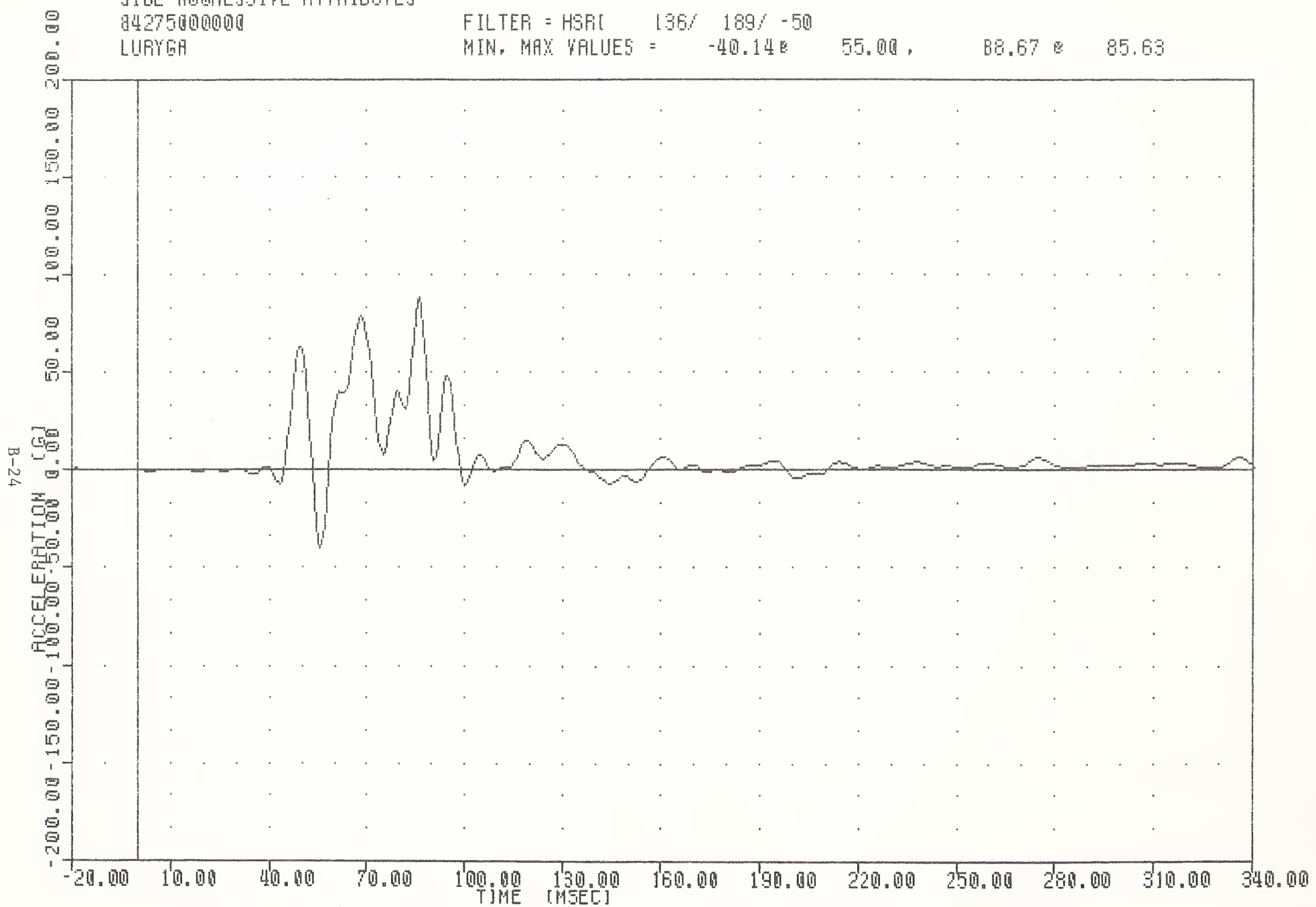


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT UPPER RIB ACCELERATION Y AXIS

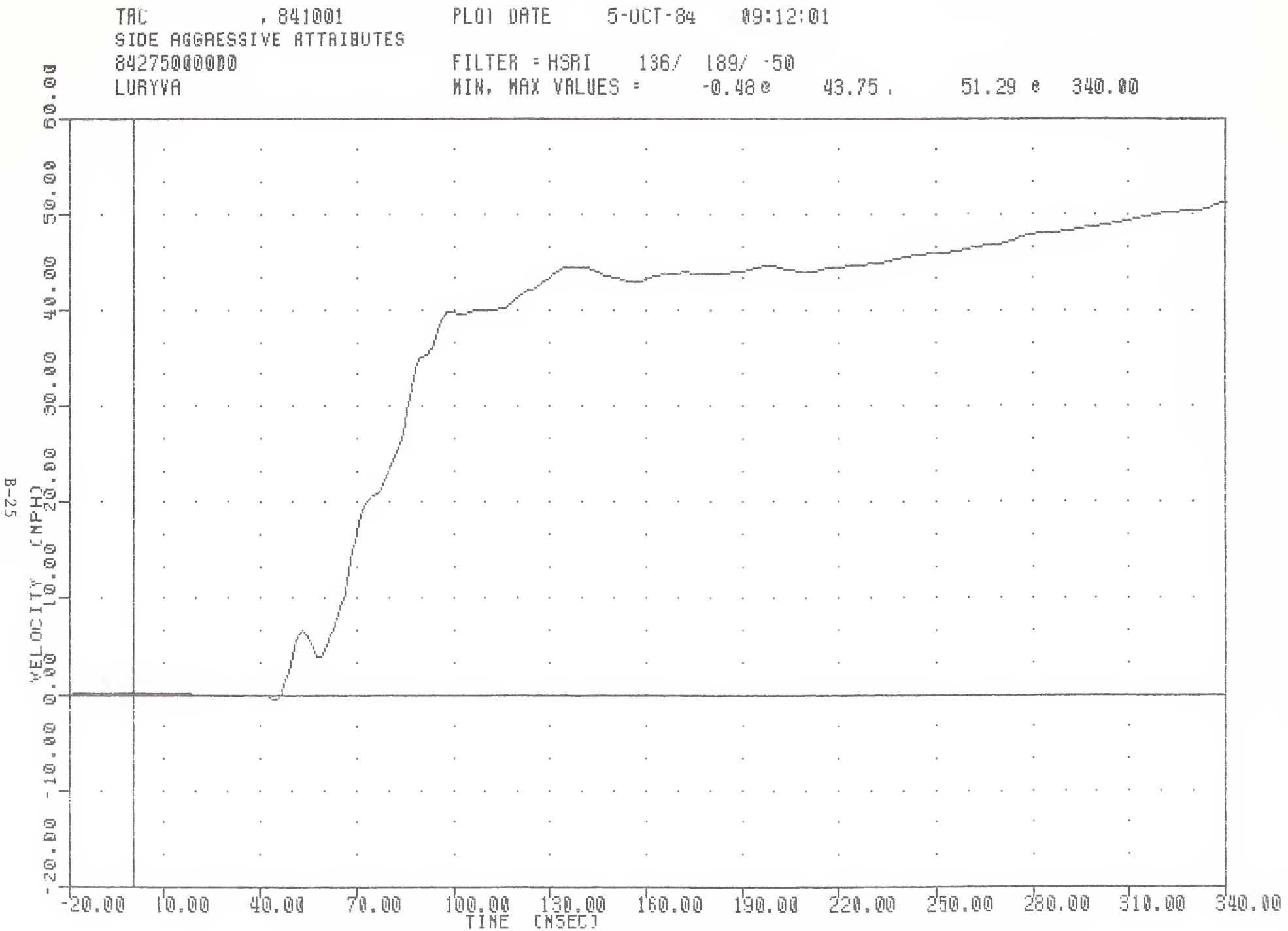
TRC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = NSRI 136/ 189/ -50
LURYV1 MIN, MAX VALUES = -0.44 @ 43.75 , 54.03 @ 340.00



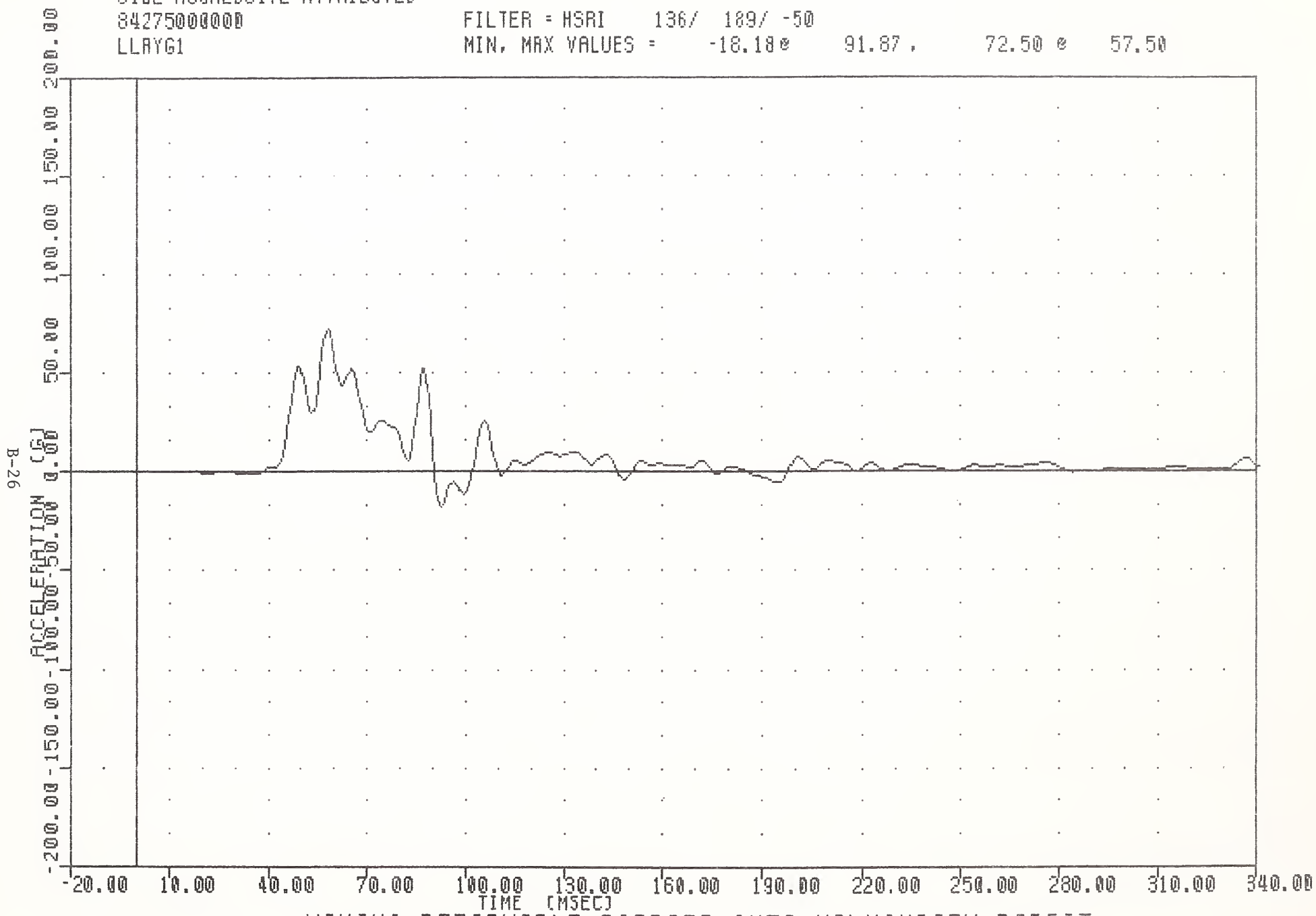
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYG1



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT UPPER RIB ACCELERATION -2 Y AXIS

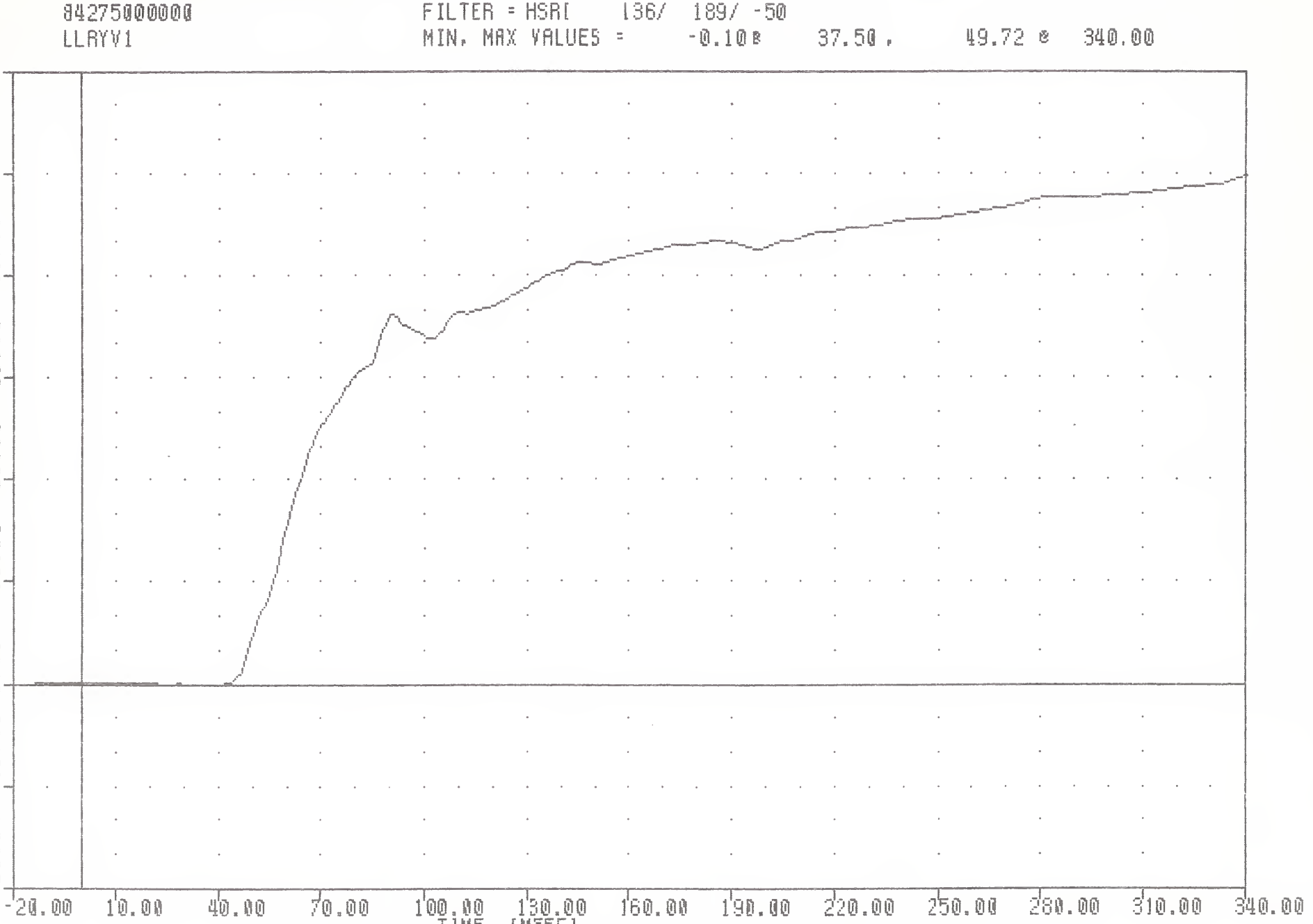


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYGA



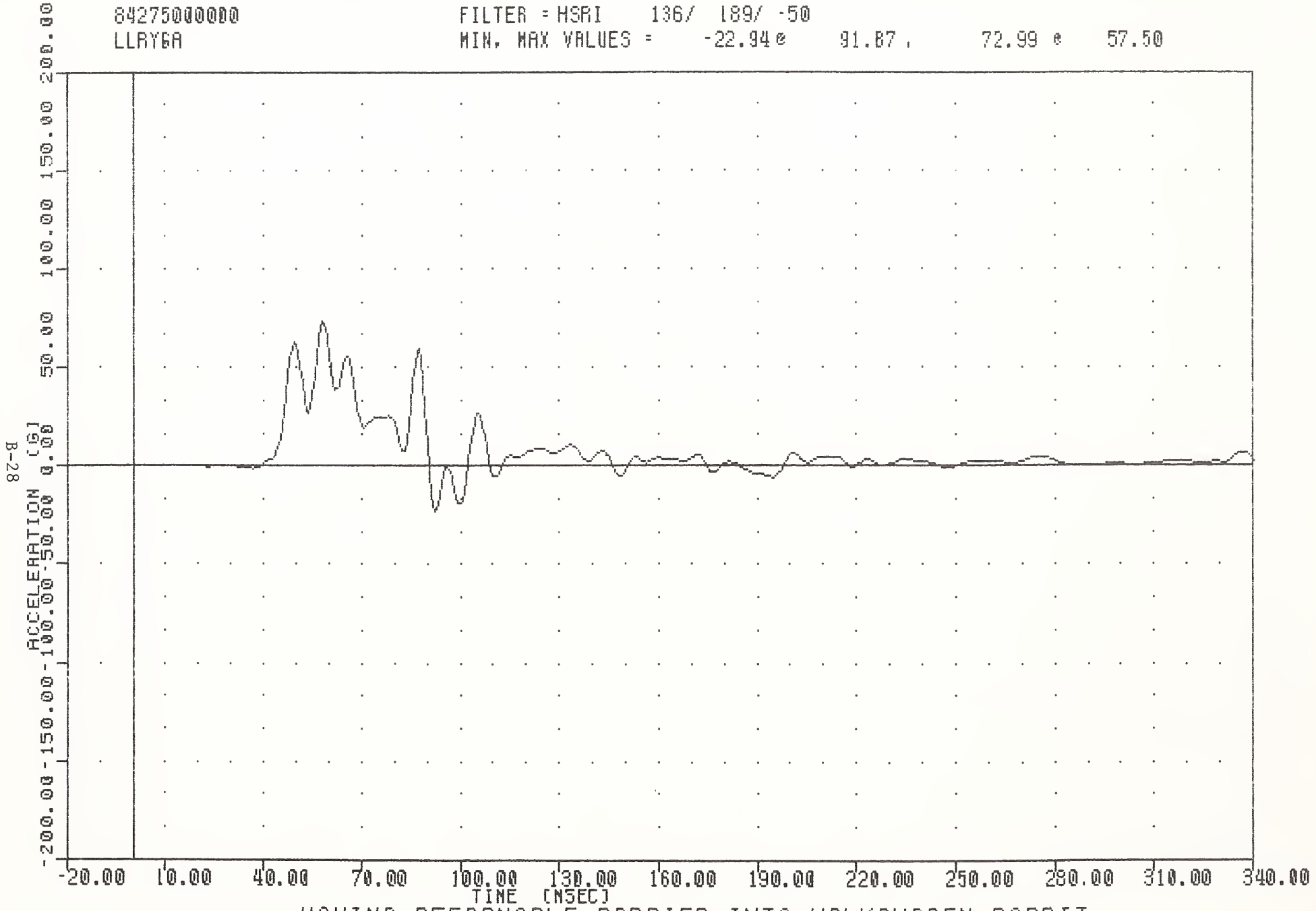
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT LOWER RIB ACCELERATION Y AXIS

TRC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
LLRYV1 MIN. MAX VALUES = -0.10 @ 37.50 , 49.72 @ 340.00

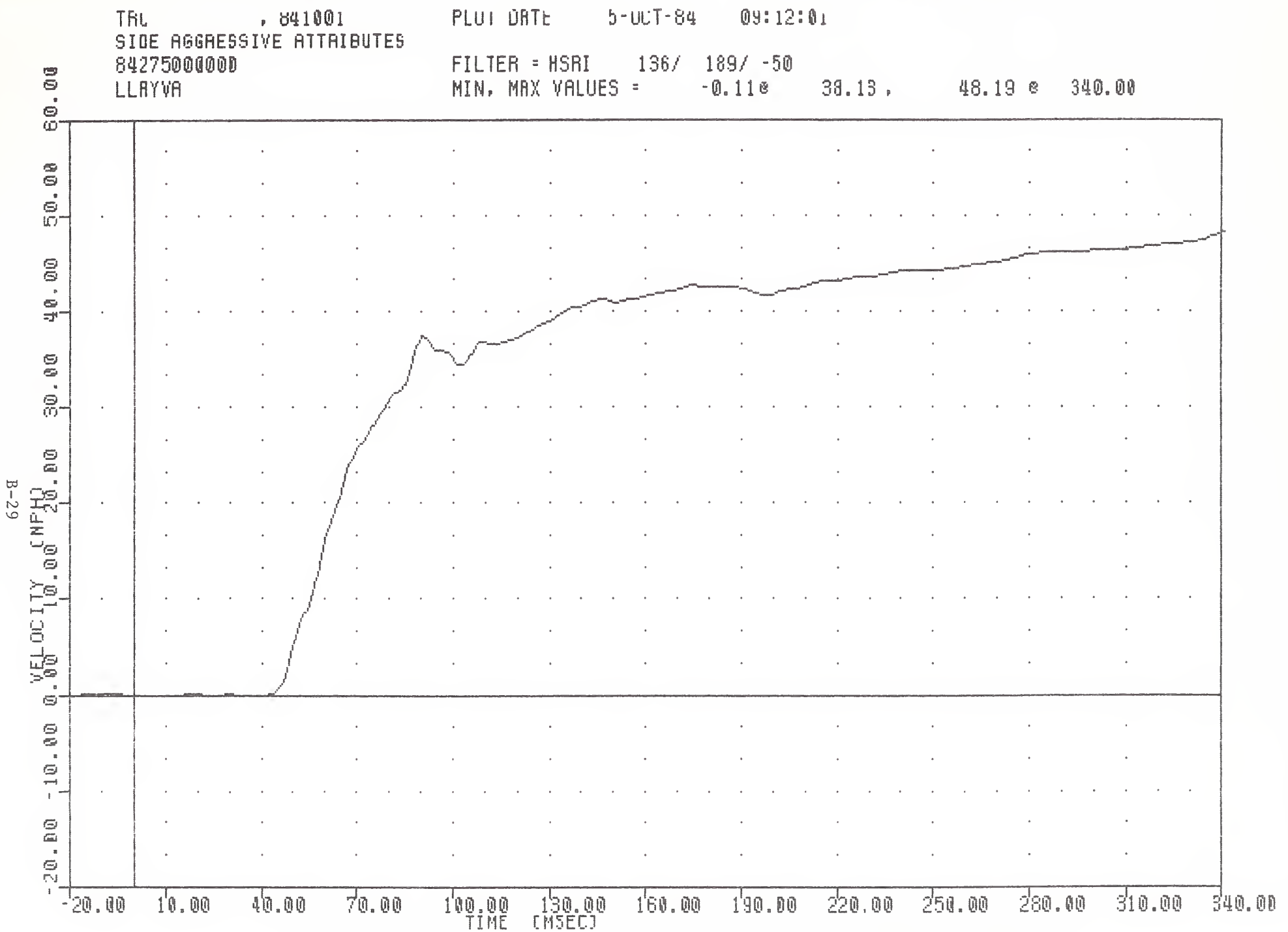


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYG1

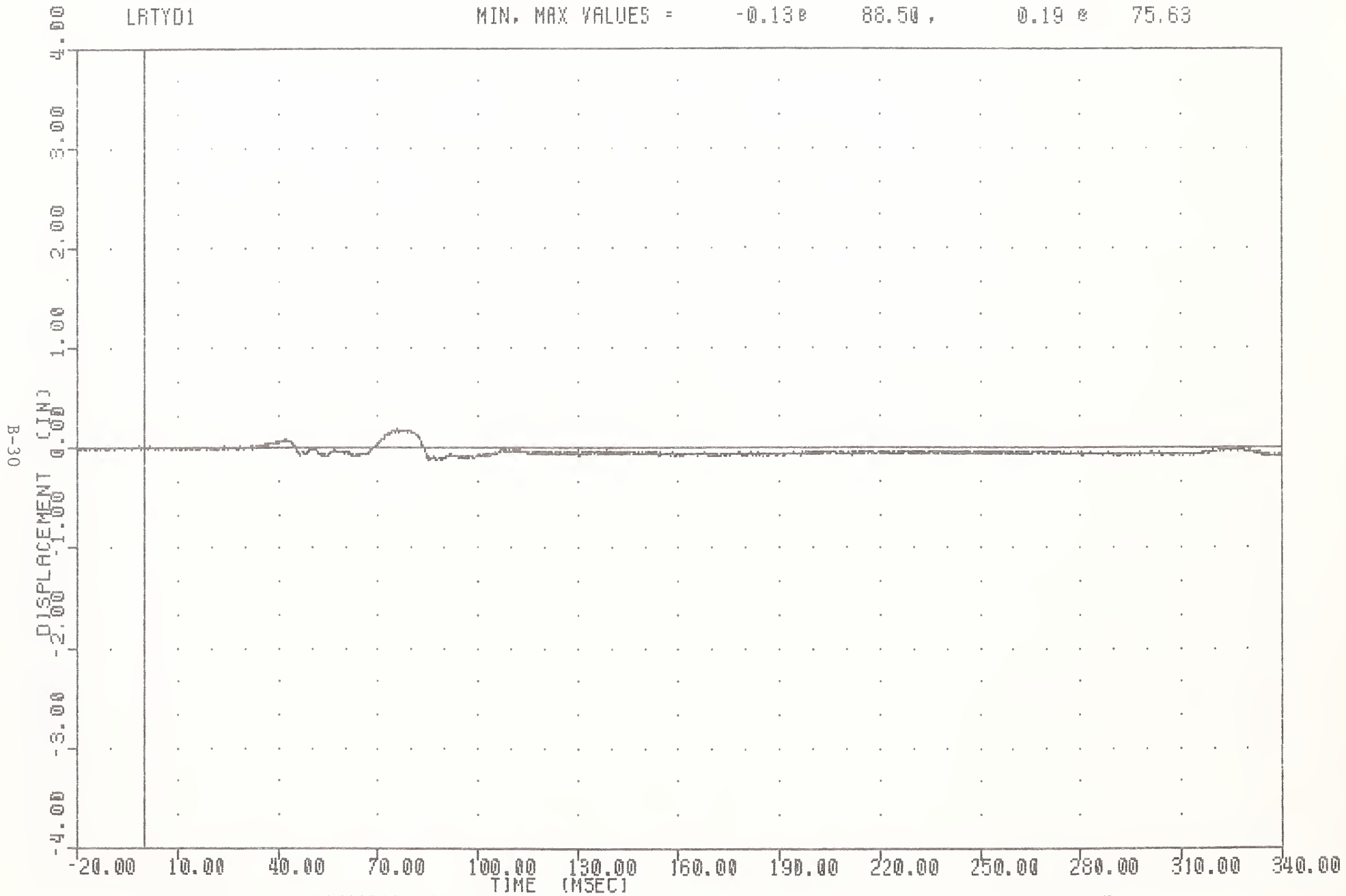
TRC , 841001 PLOT DATE 5-OCT-84 09:09:17
SIDE AGGRESSIVE ATTAIBUTES
842750000000 FILTER = HSRI 136/ 189/ -50
LLRYGA MIN, MAX VALUES = -22.94 @ 91.87 , 72.99 @ 57.50



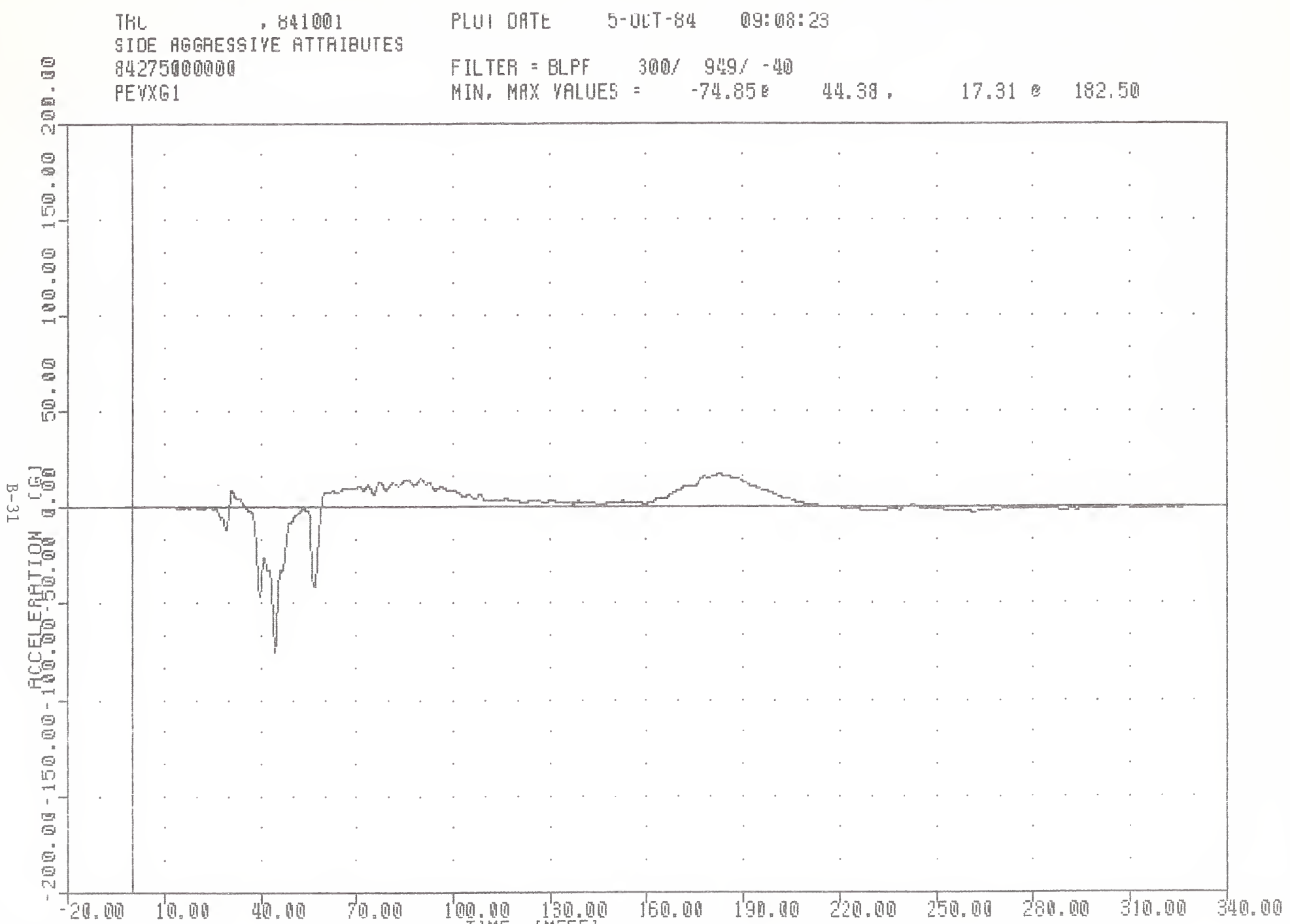
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT LOWER RIB ACCELERATION -2 Y AXIS



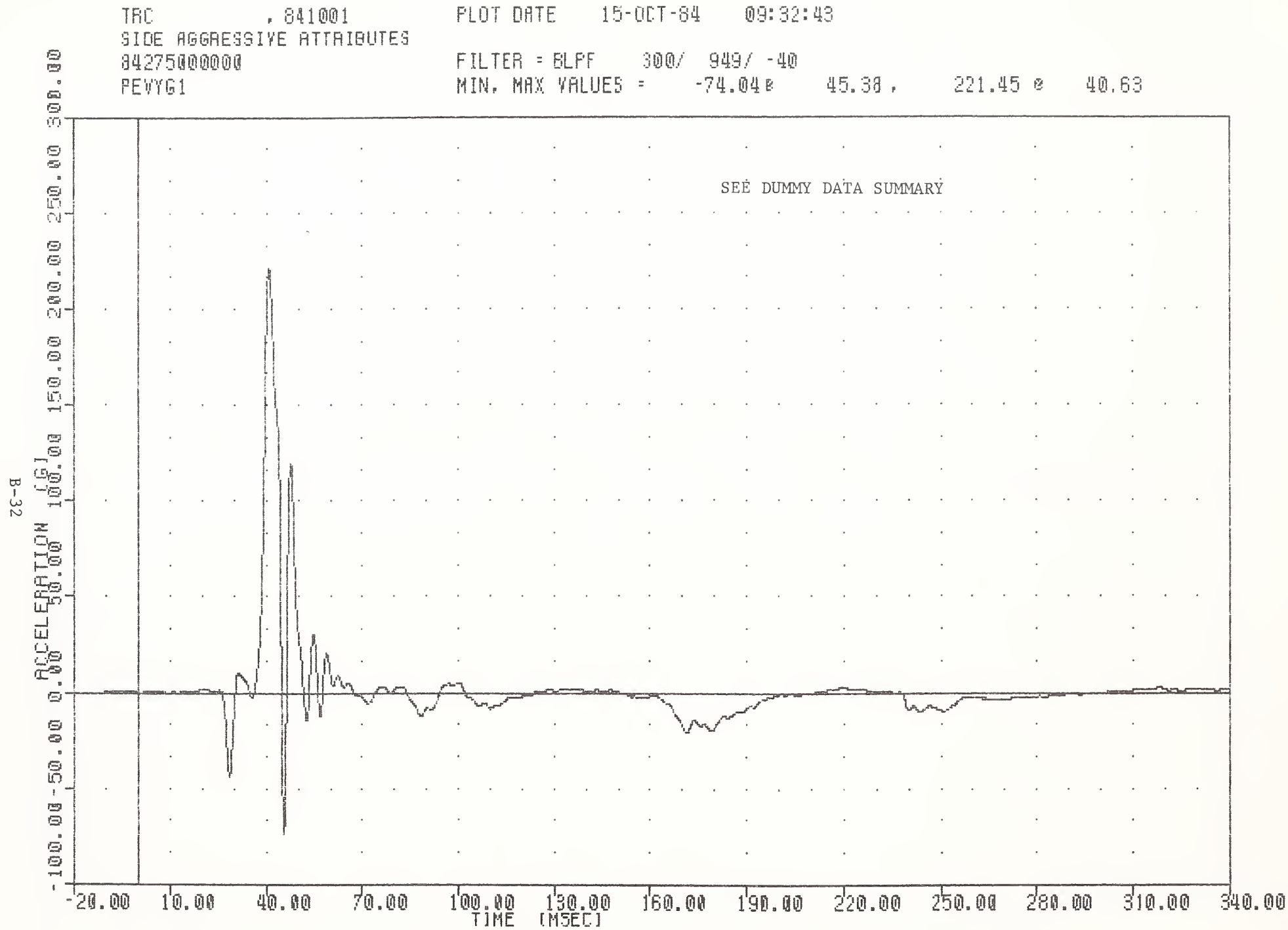
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYGA



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER LEFT RIB TO SPINE DISPLACEMENT INCHES

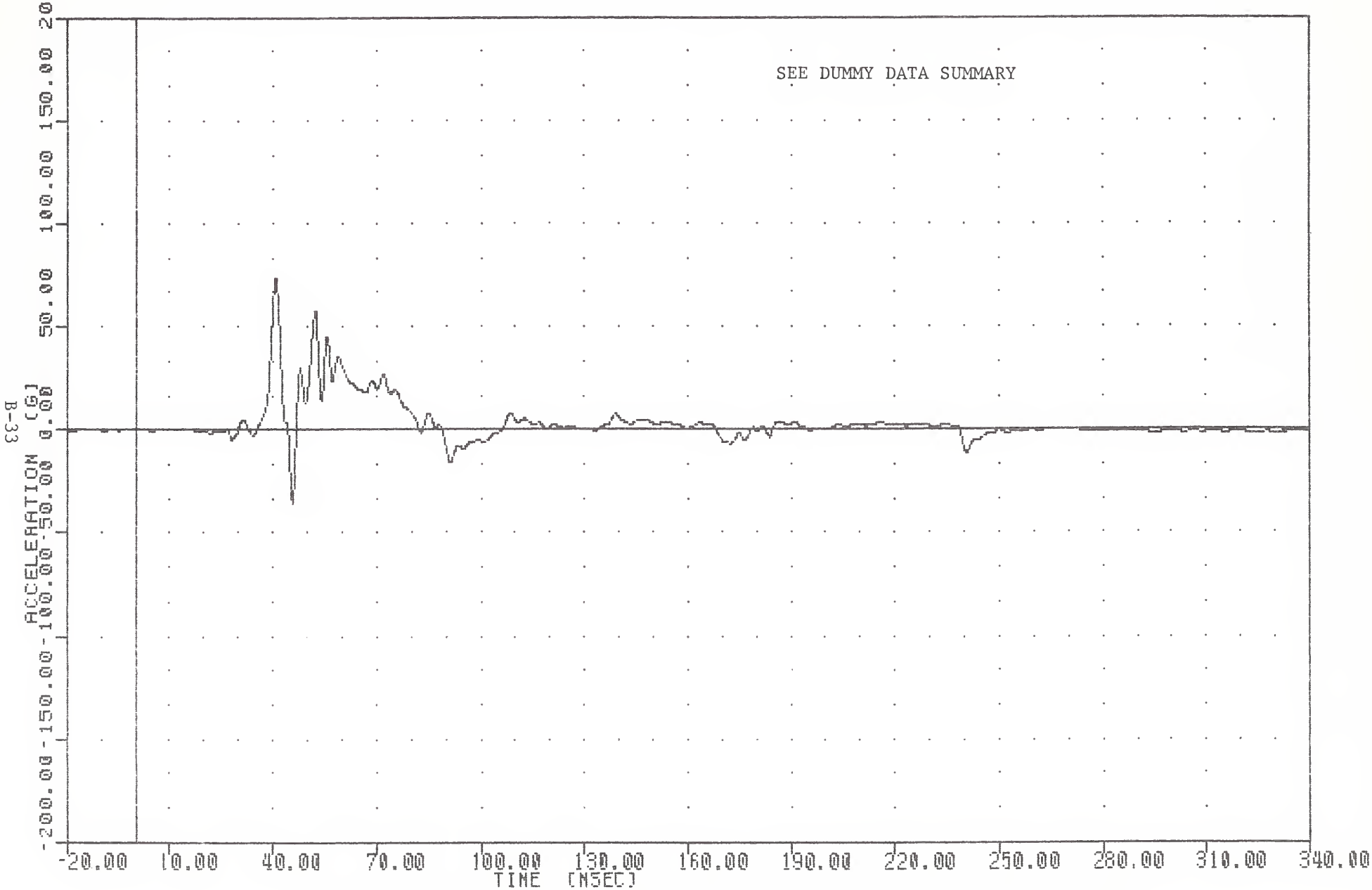


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION X AXIS

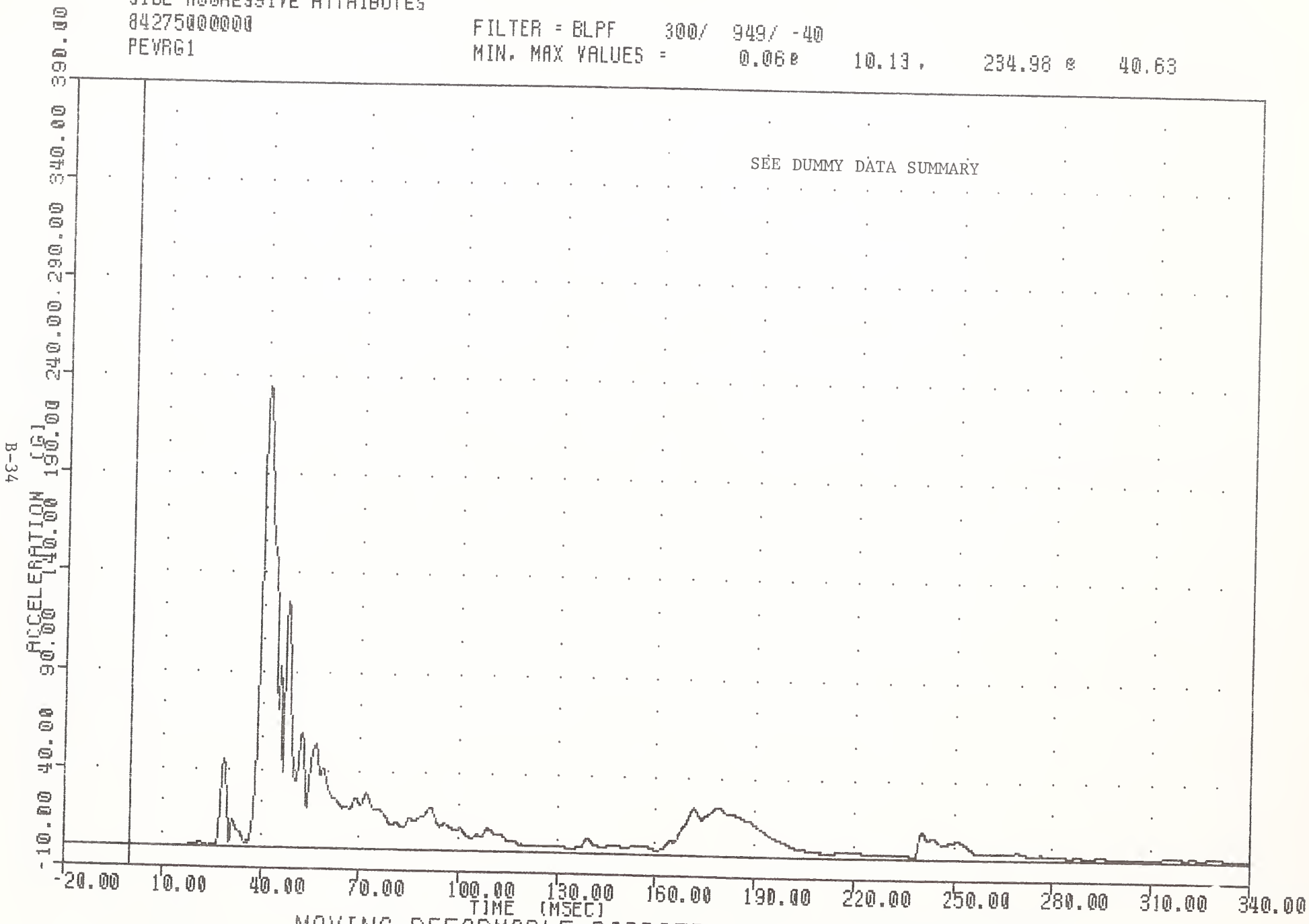


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION Y AXIS

TRC , 841001 PLOT DATE 5-OCT-84 09:08:23
SIDE AGGRESSIVE ATTRIBUTES
842750000D0 FILTER = BLPF 300/ 949/ -40
PEVZG1 MIN, MAX VALUES = -36.00 @ 45.50 , 73.81 @ 40.63

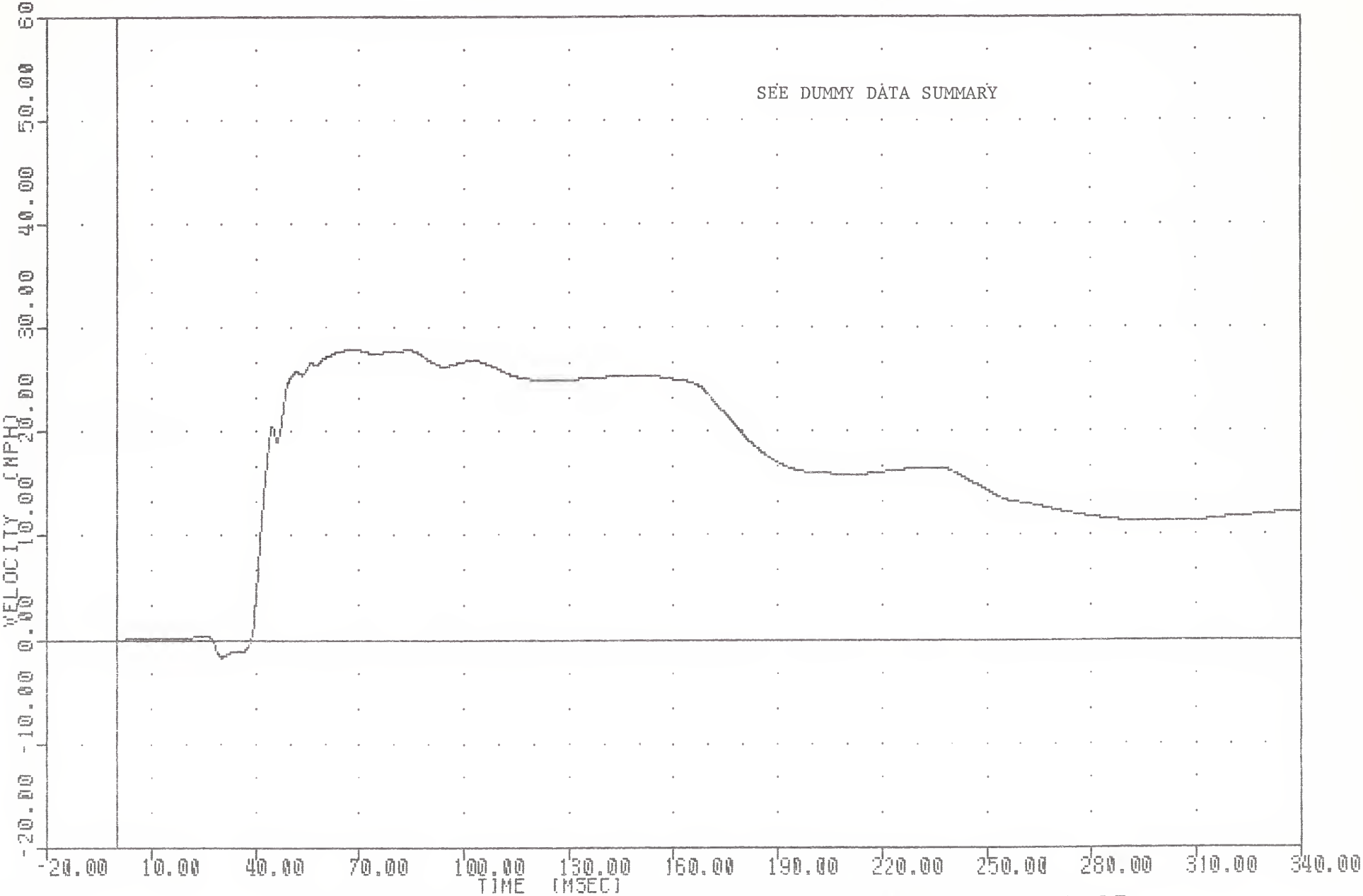


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS ACCELERATION Z AXIS



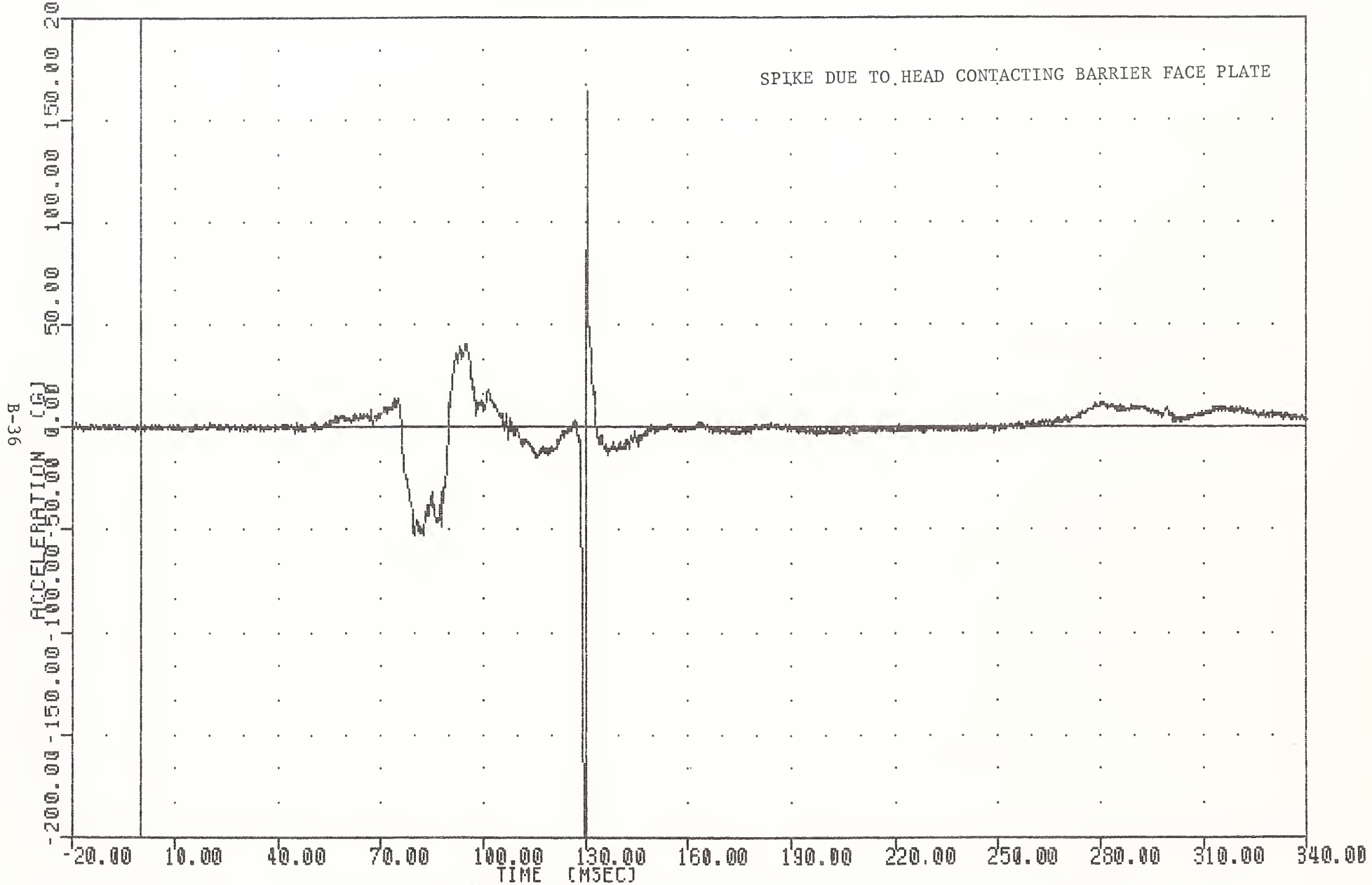
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DRIVER PELVIS RESULTANT

TRC , 841001 PLOT DATE 5-OCT-84 09:13:01
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = BLPF 300/ 949/ -40
PEVYV1 MIN, MAX VALUES = -1.73 @ 30.13 , 27.89 @ 67.13

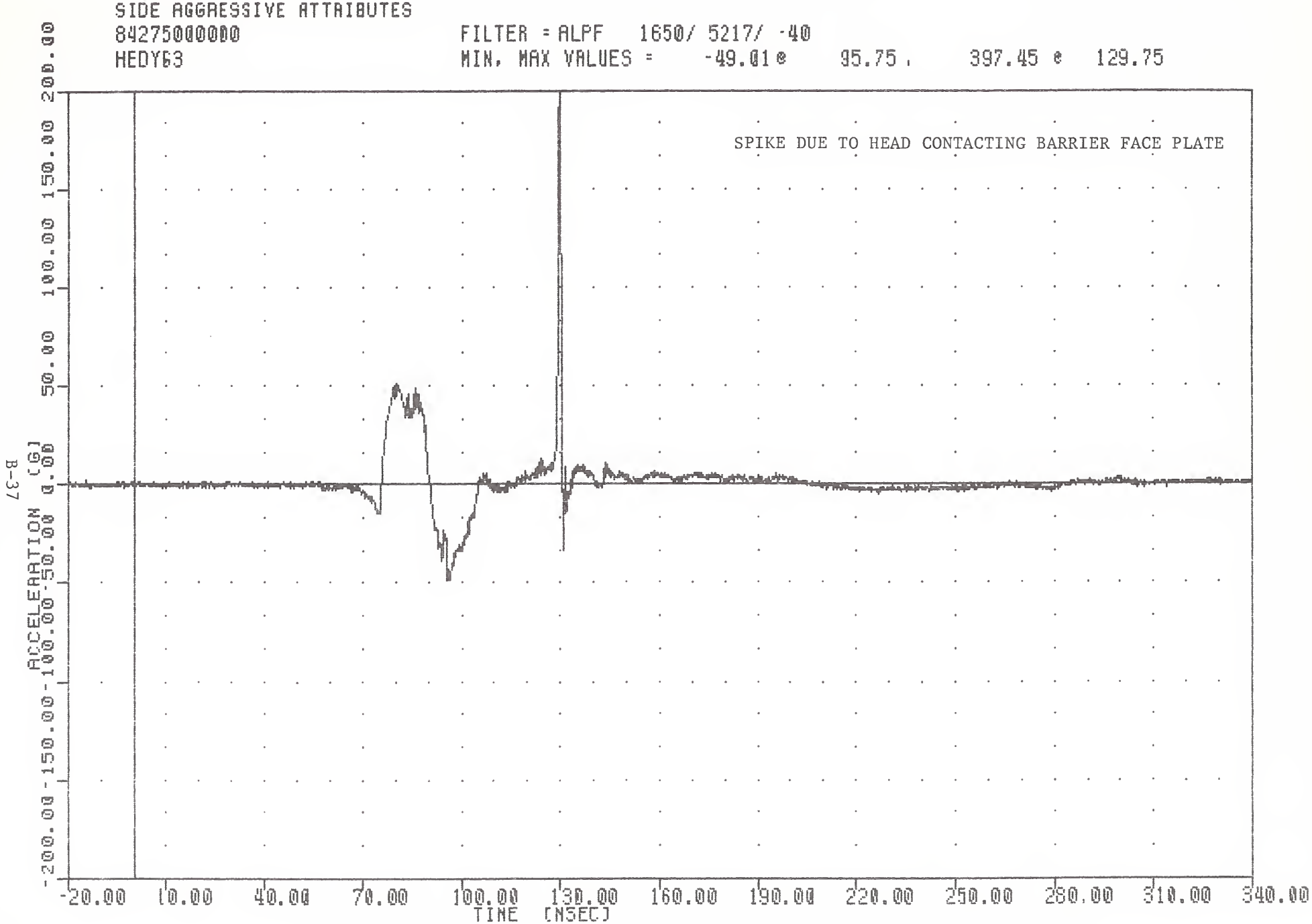


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING PEVYG1

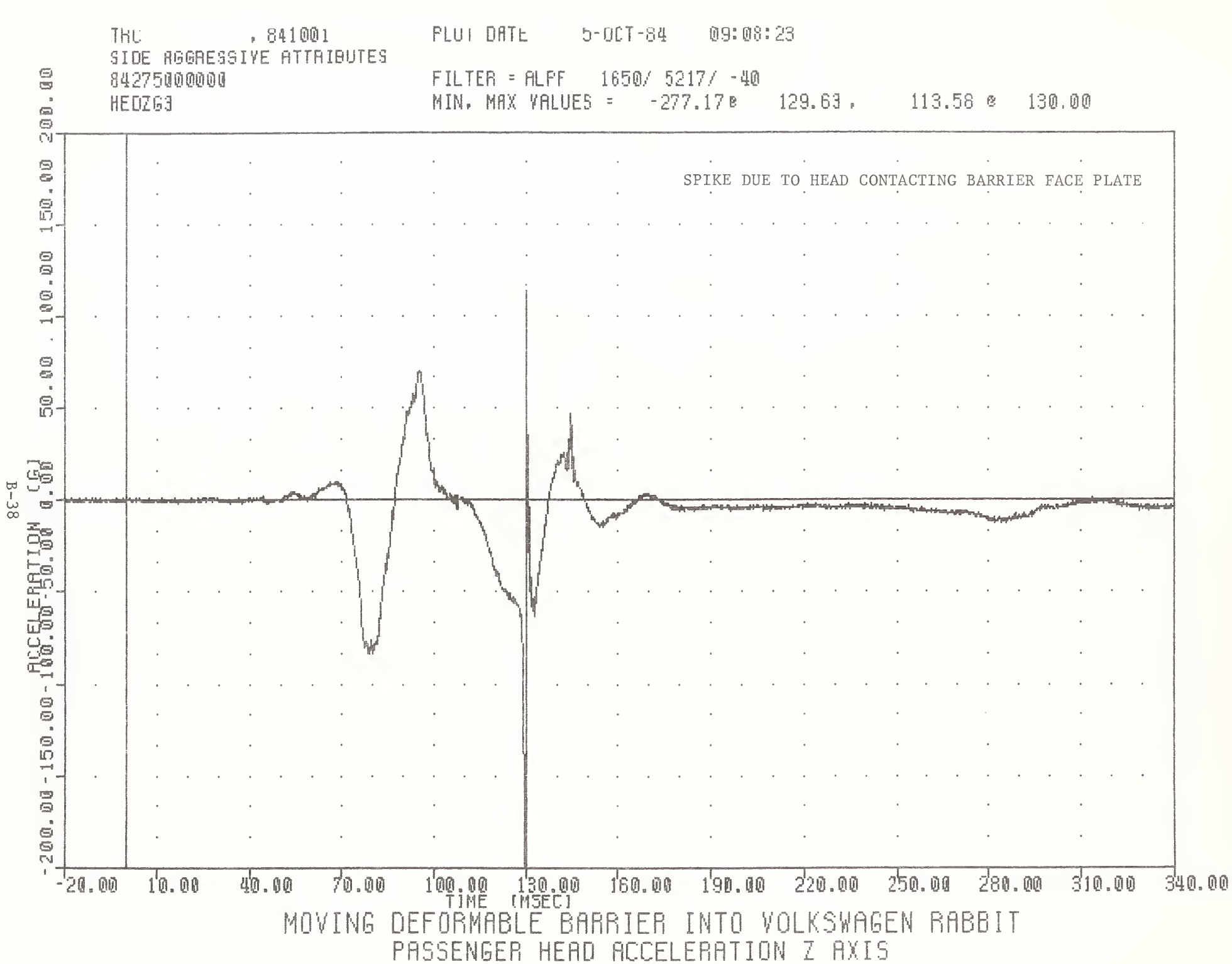
TRC , 841001 PLOT DATE 5-OCT-84 09:08:23
SIDE AGGRESSIVE ATTAIBUTES
84275000000 FILTER = ALPF 1650/ 5217/ -40
HEDXG3 MIN, MAX VALUES = -311.92@ 129.63 , 163.09 @ 130.38



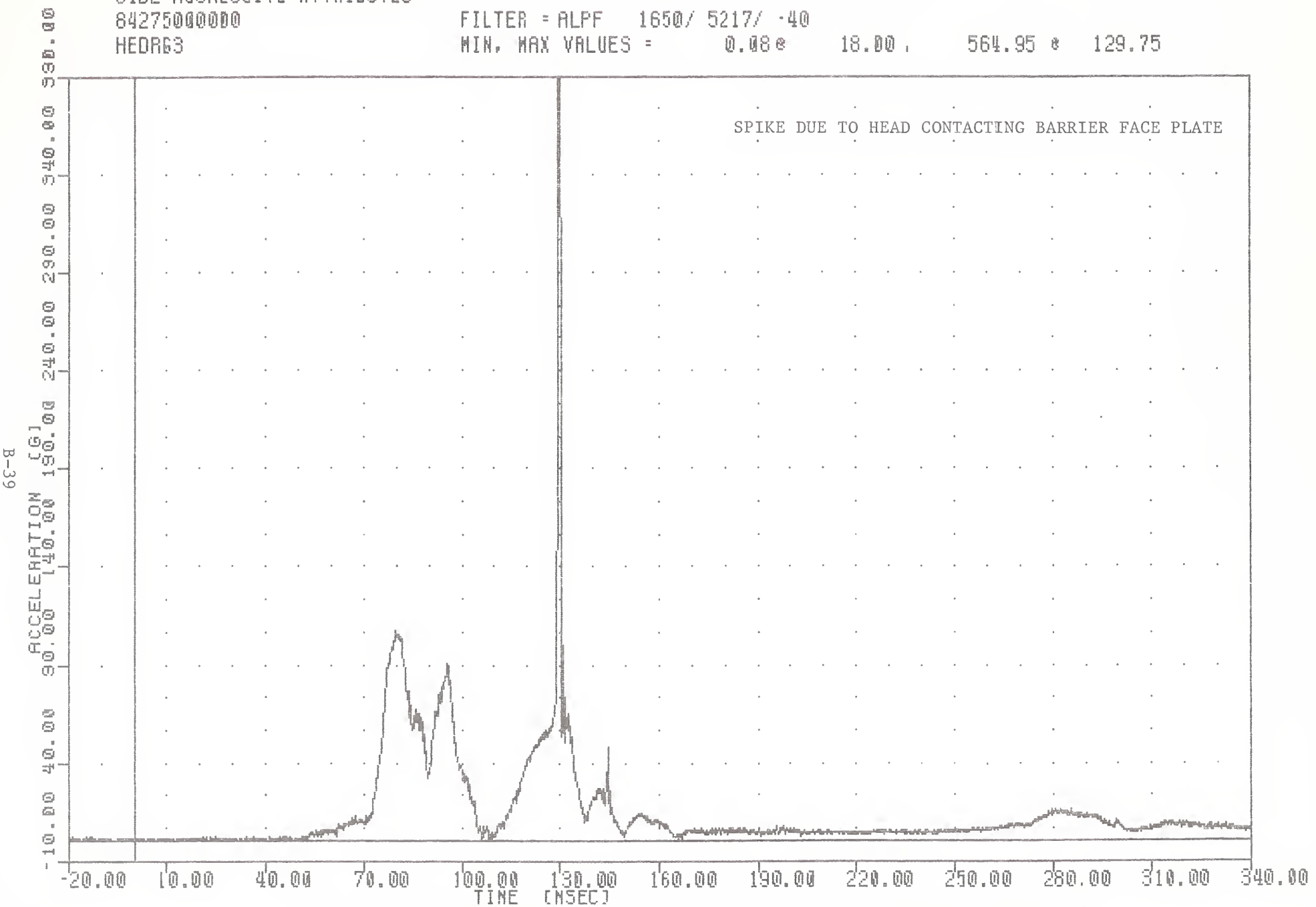
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION X AXIS



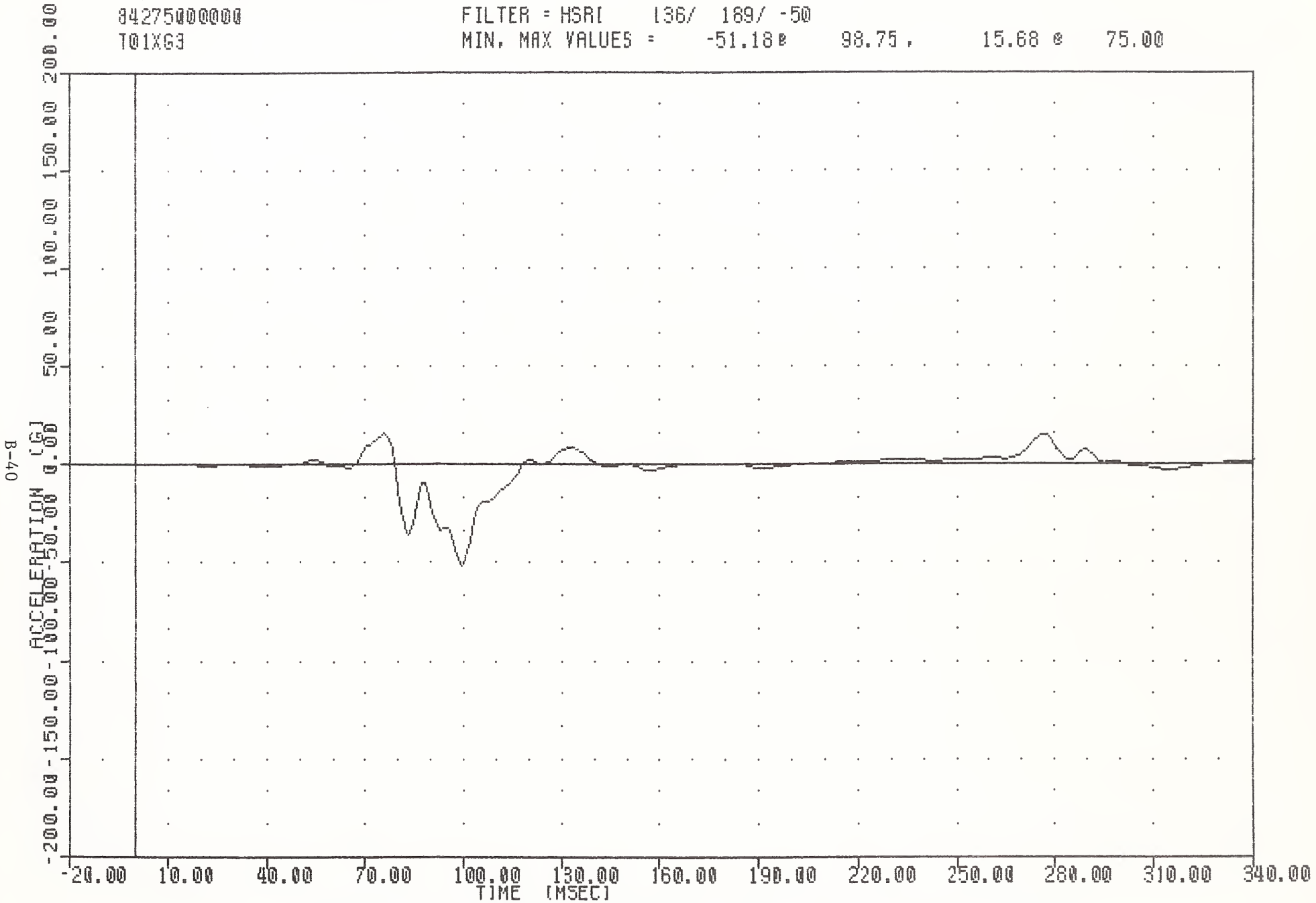
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Y AXIS



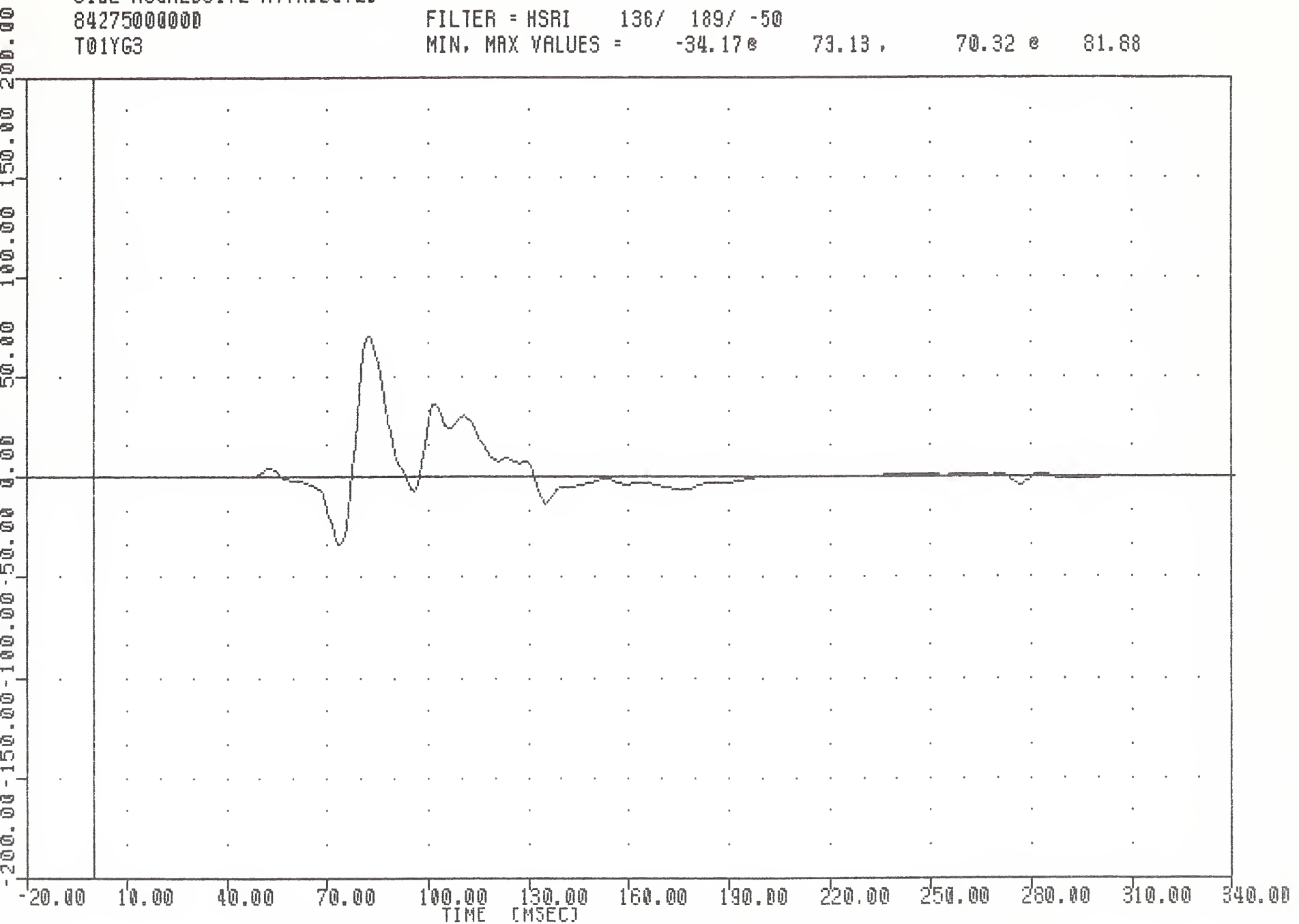
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD ACCELERATION Z AXIS



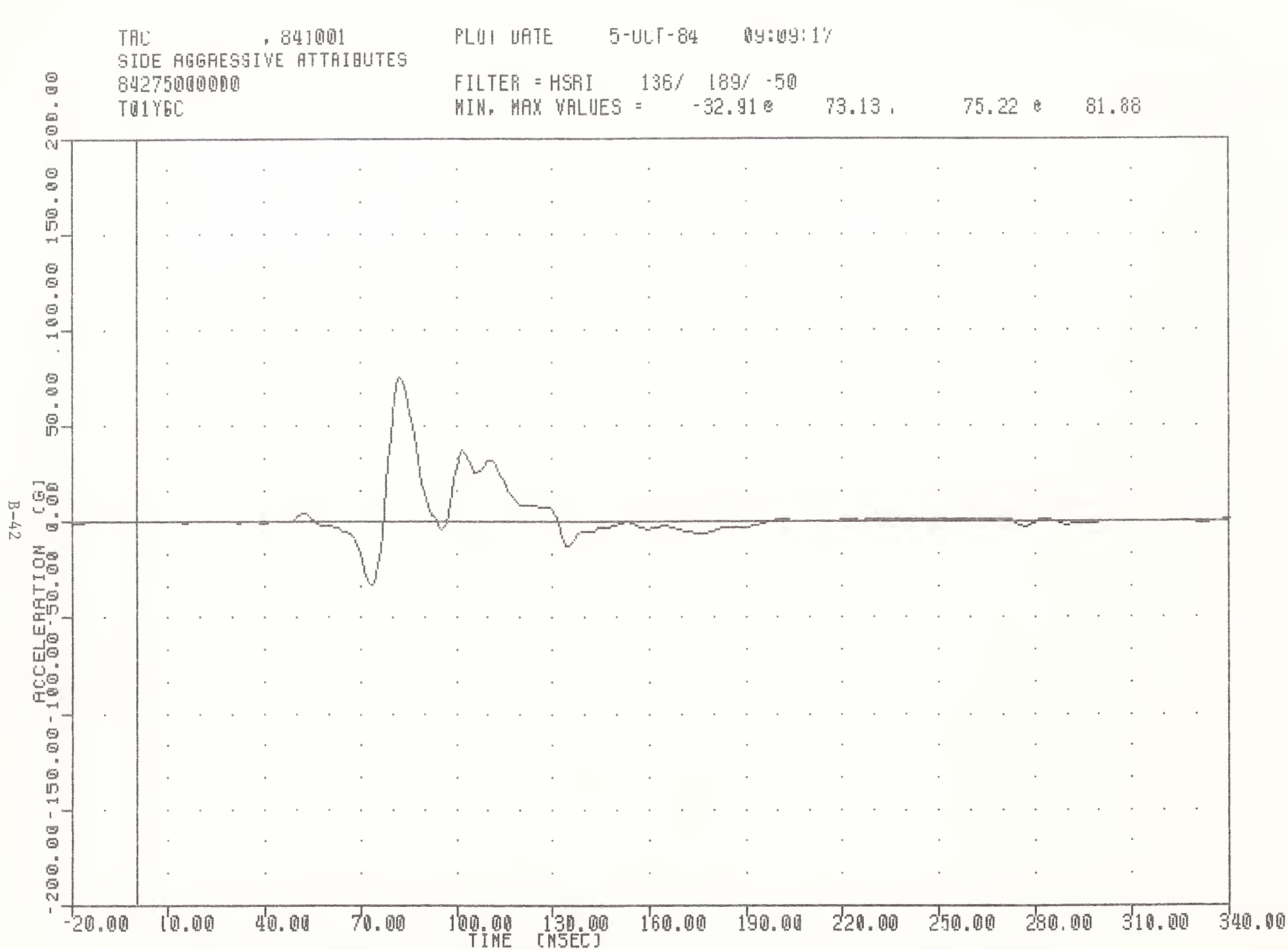
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER HEAD RESULTANT



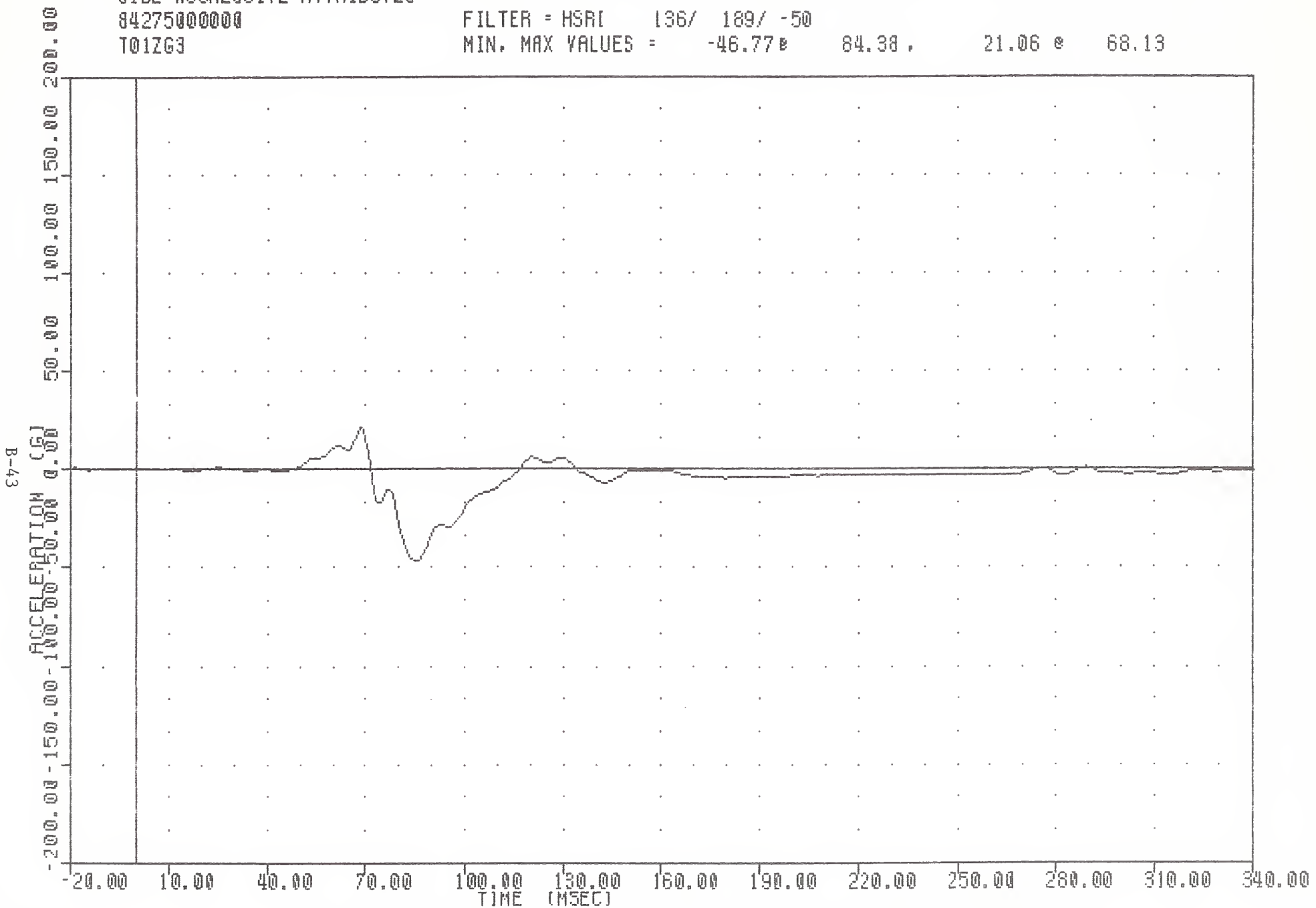
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION X AXIS



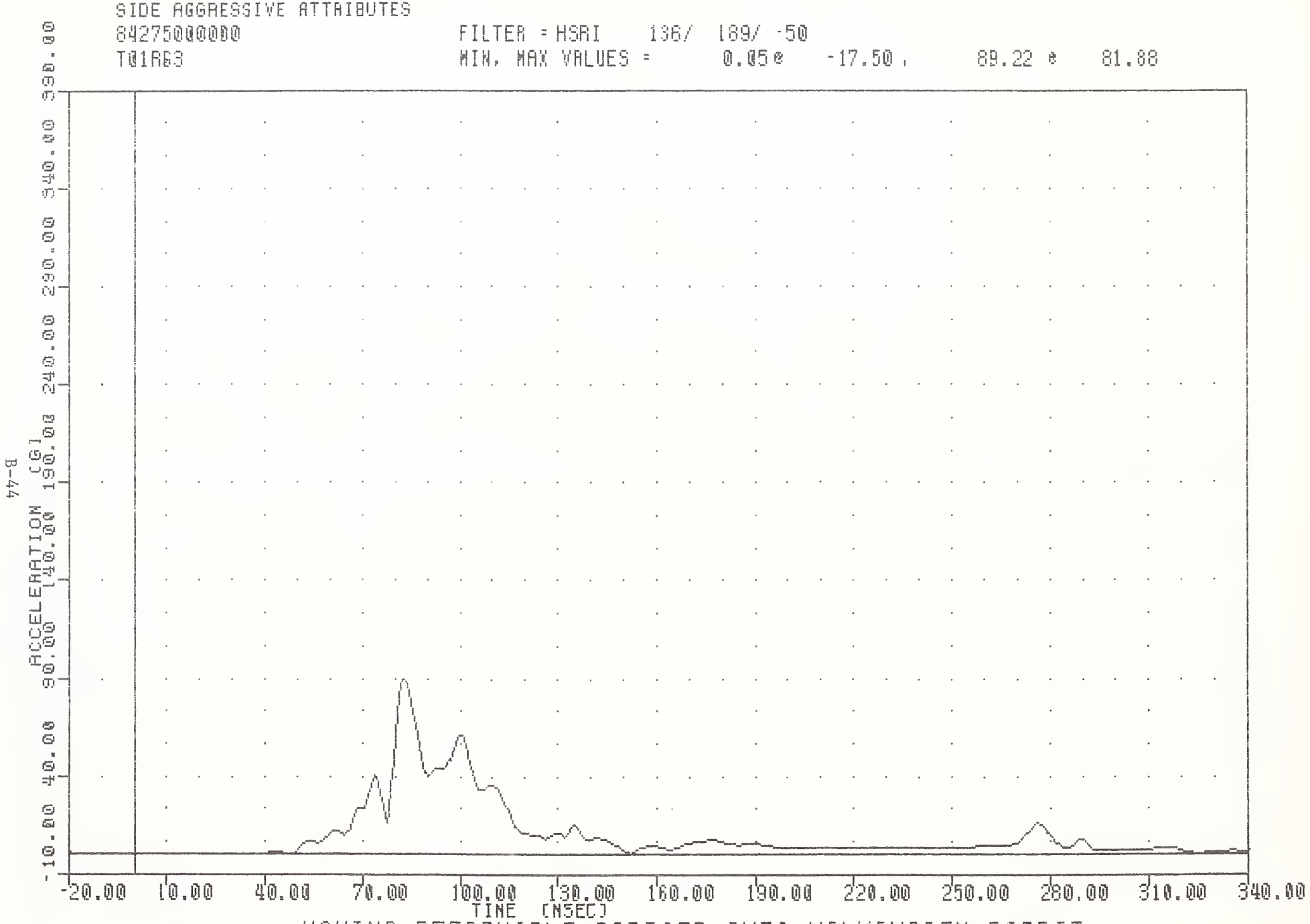
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION Y AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION -2 Y AXIS

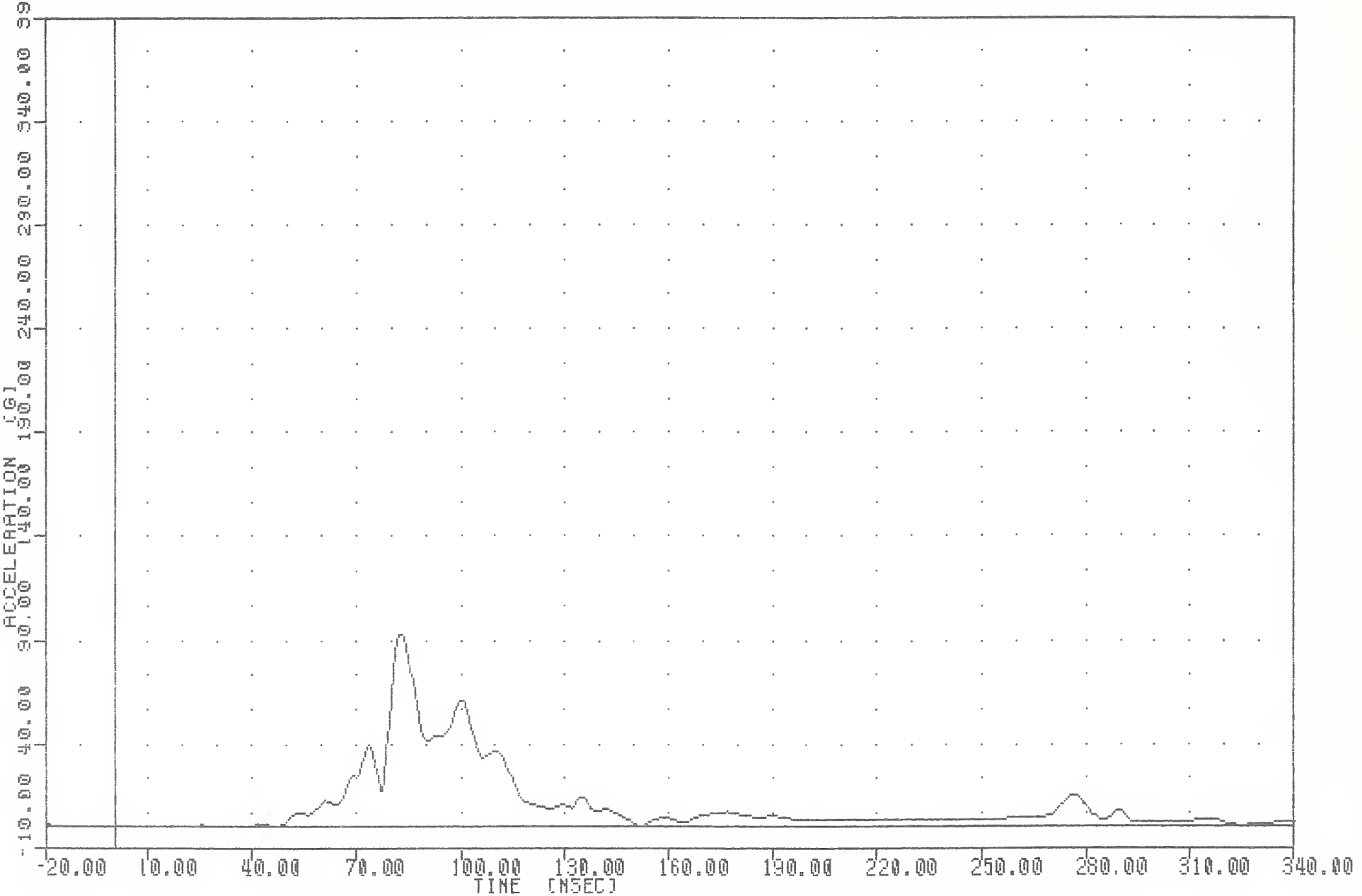


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE ACCELERATION Z AXIS



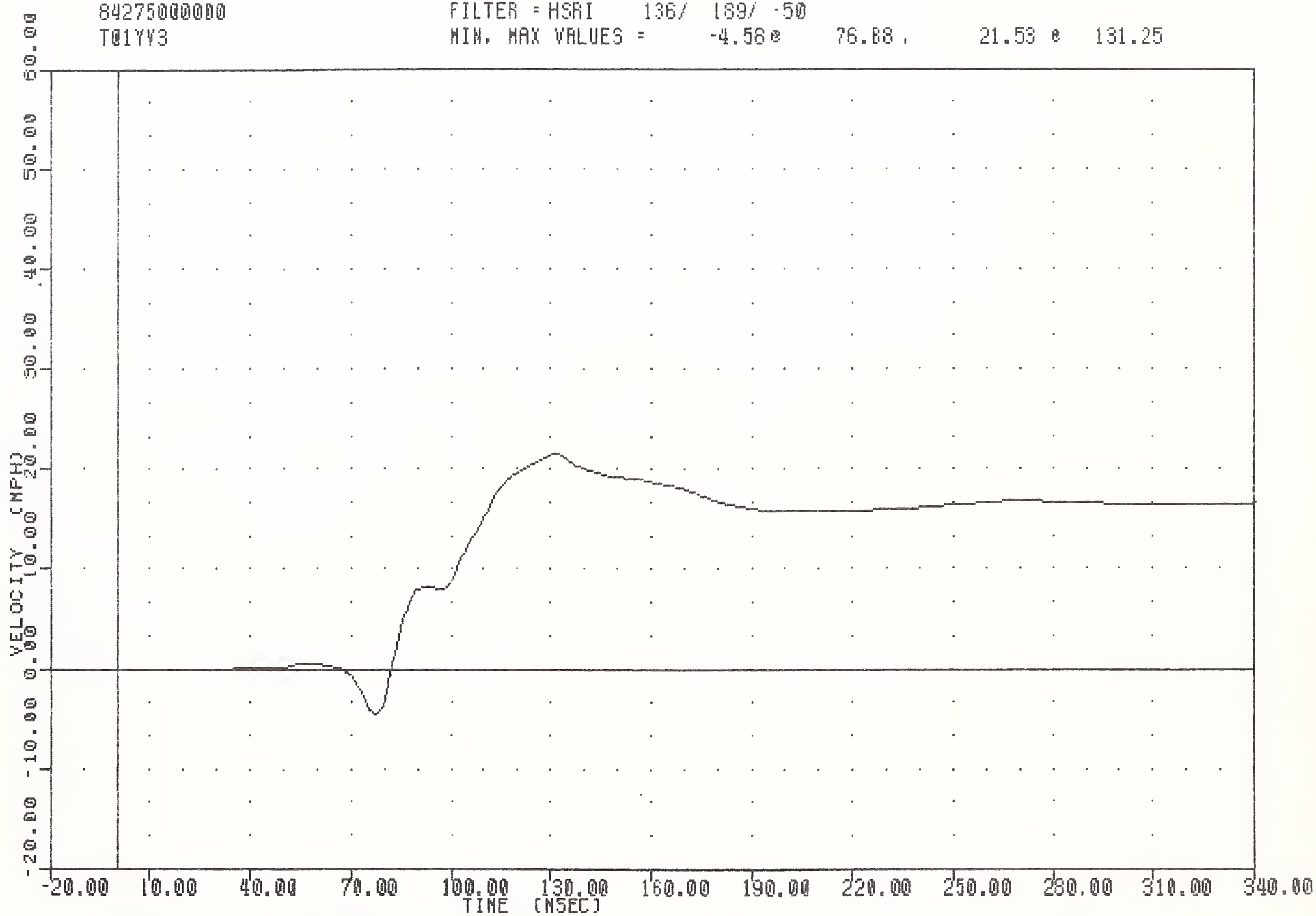
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE RESULTANT

TAC , 841001 PLOT DATE 5-OCT-84 09:10:15
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
T01RGC MIN, MAX VALUES = 0.10 @ 29.38 , 93.13 @ 81.88



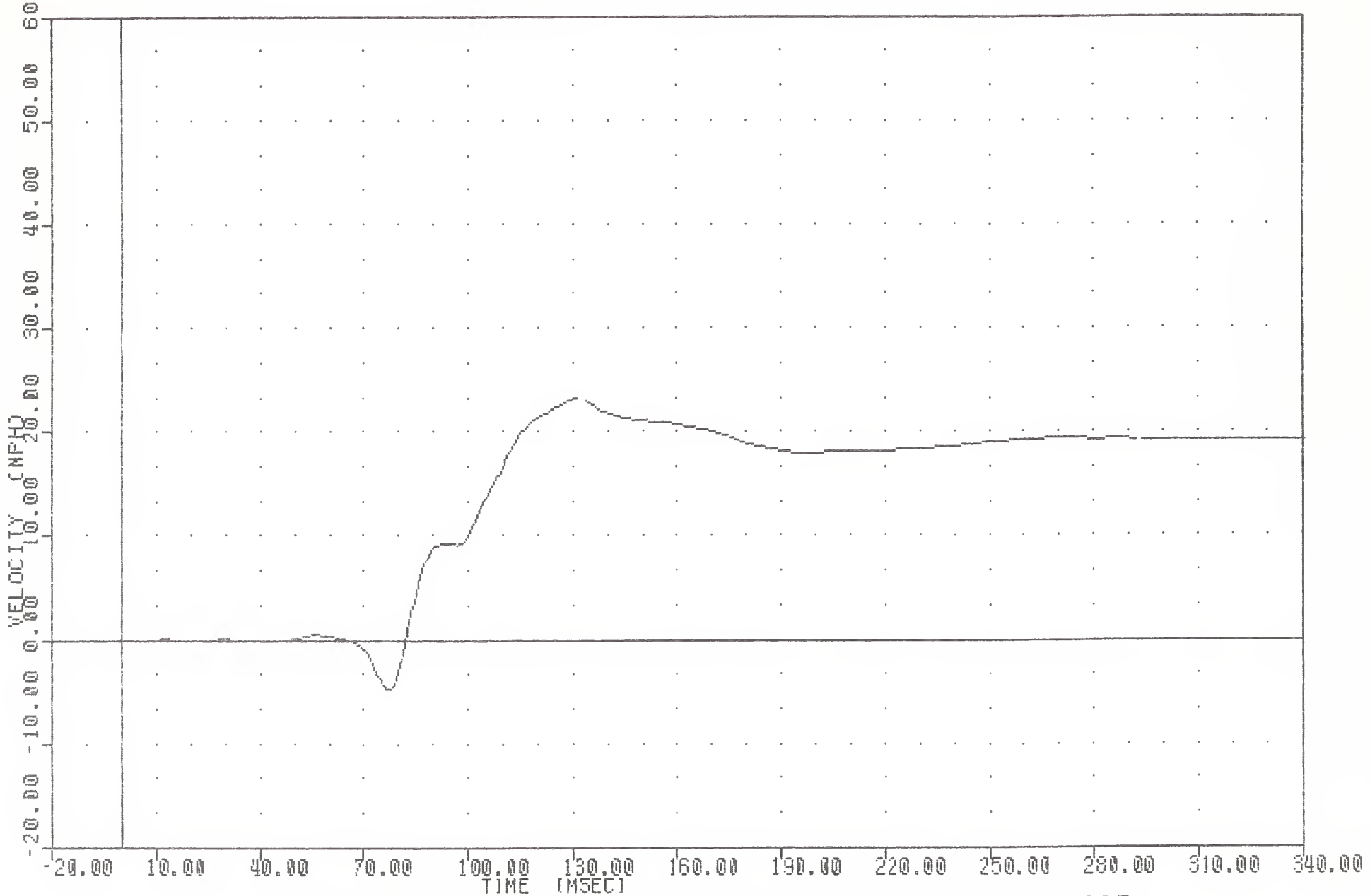
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER UPPER SPINE RESULTANT USING T01YGC

TRC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTAIBUTES
842750000D0 FILTER = HSRI 136/ 189/ -50
T01YV3 MIN, MAX VALUES = -4.58 @ 76.88 , 21.53 @ 131.25

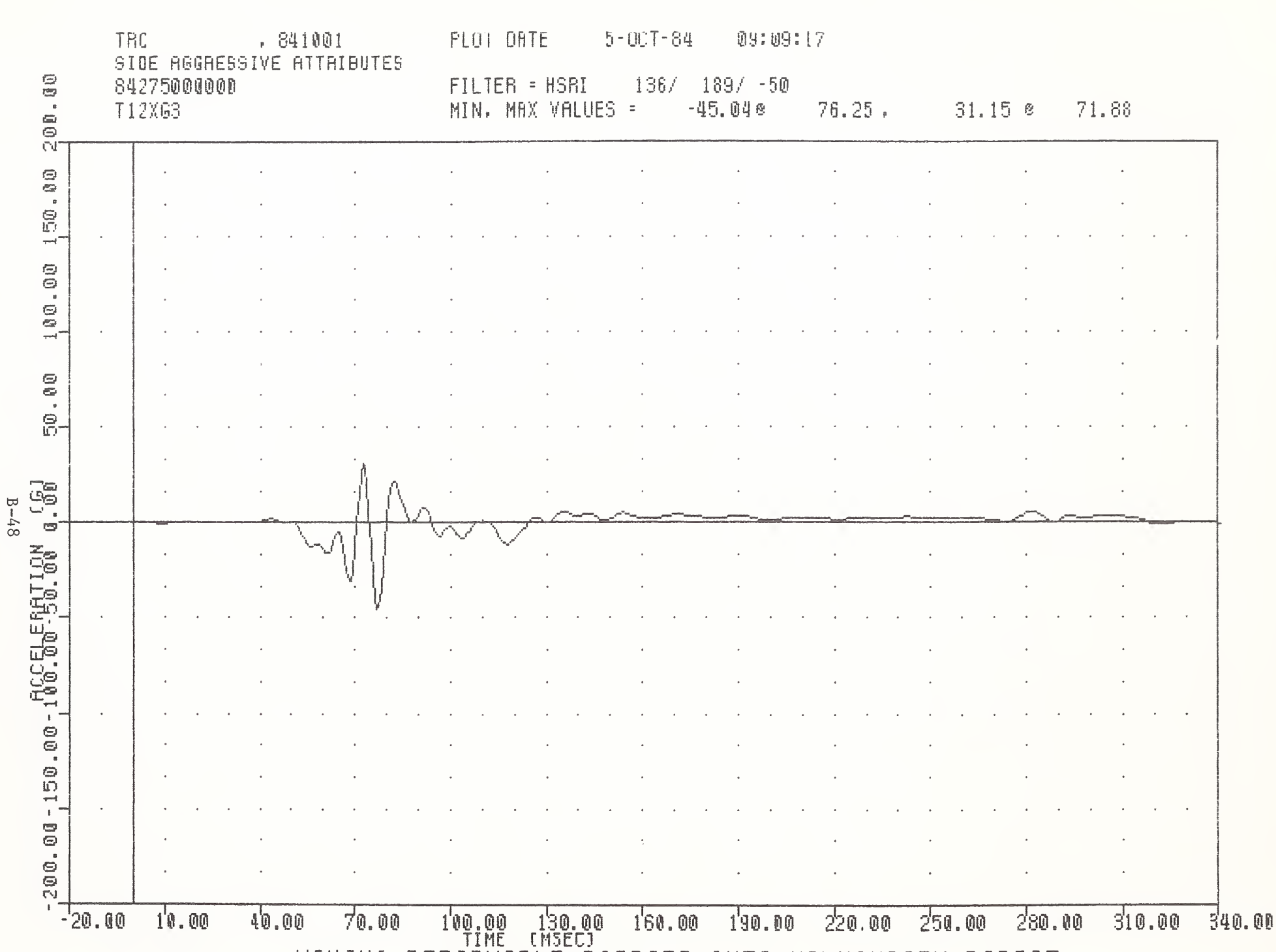


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YG3

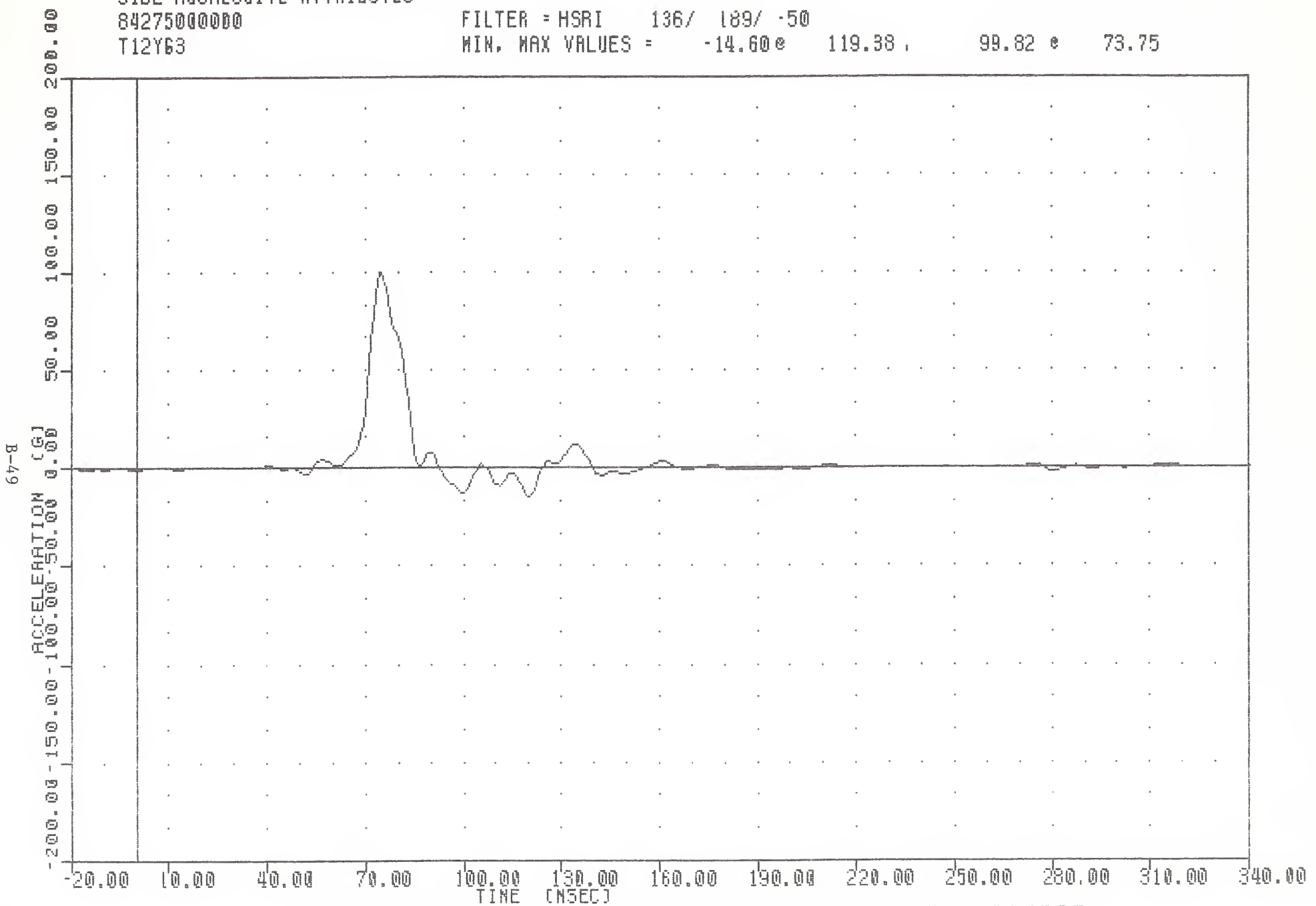
TRC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = HSRI (36/ 189/ -50
T01YVC MIN, MAX VALUES = -4.80 @ 76.25 , 23.29 @ 131.25



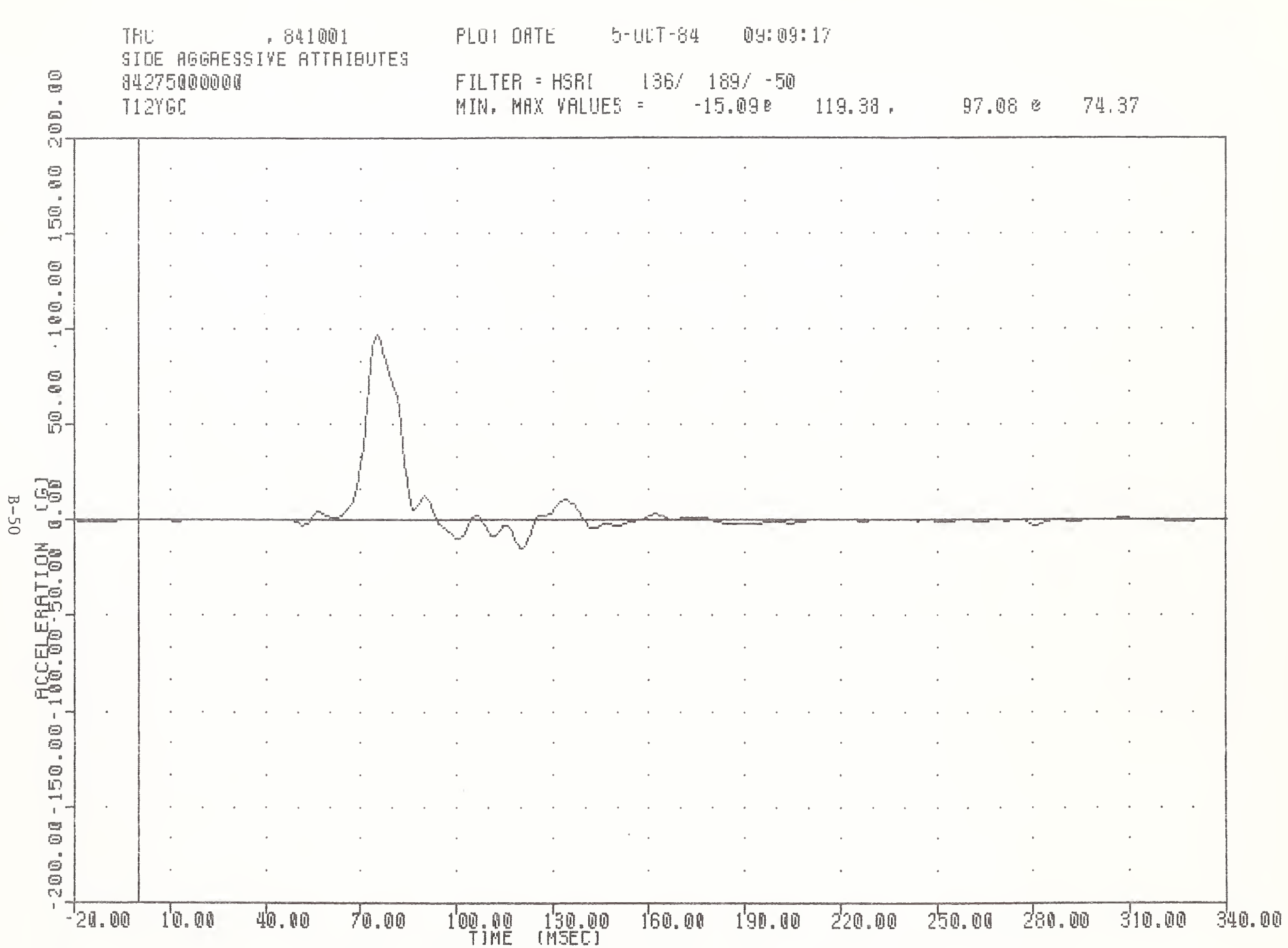
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T01YGC



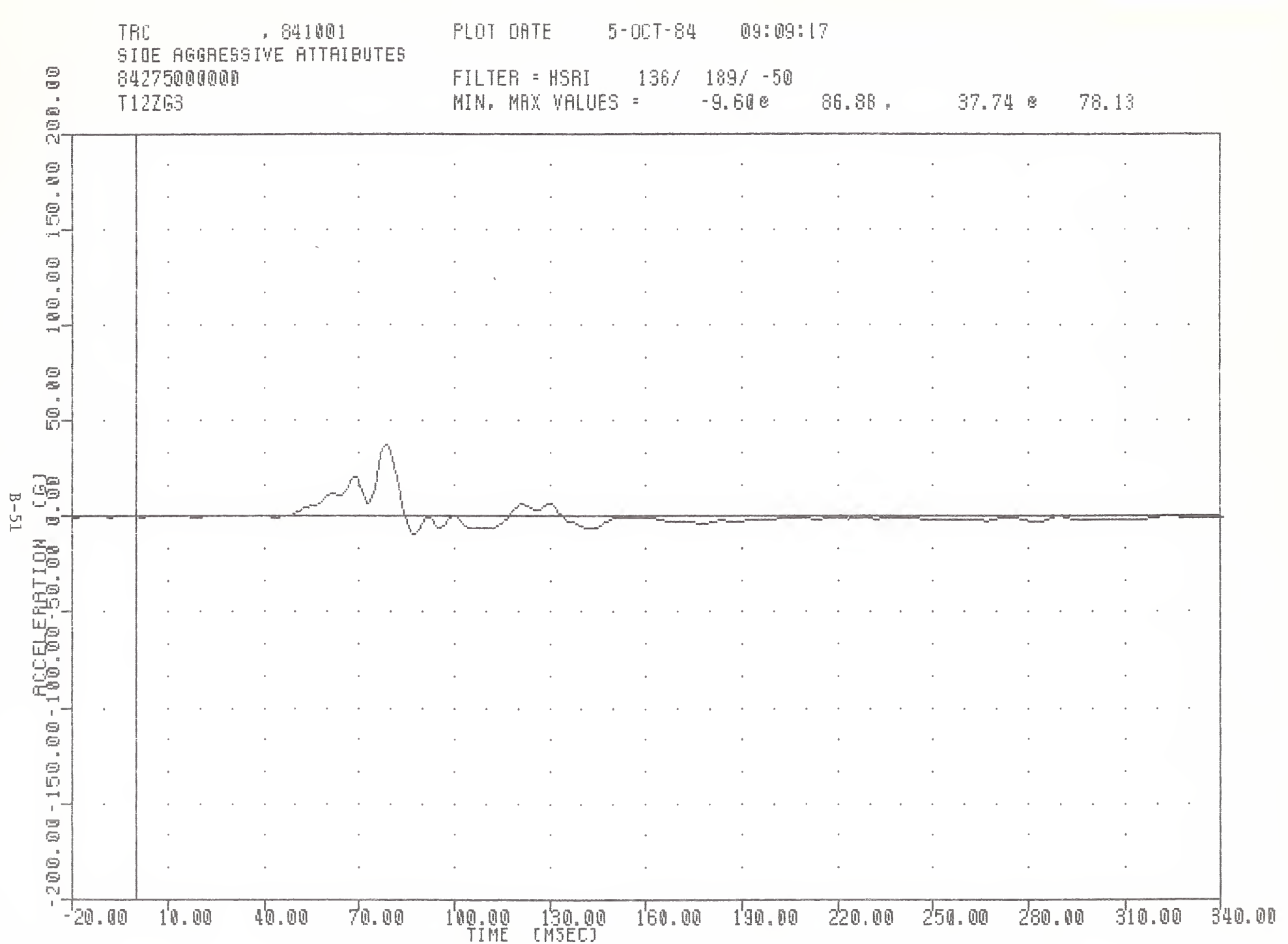
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION X AXIS



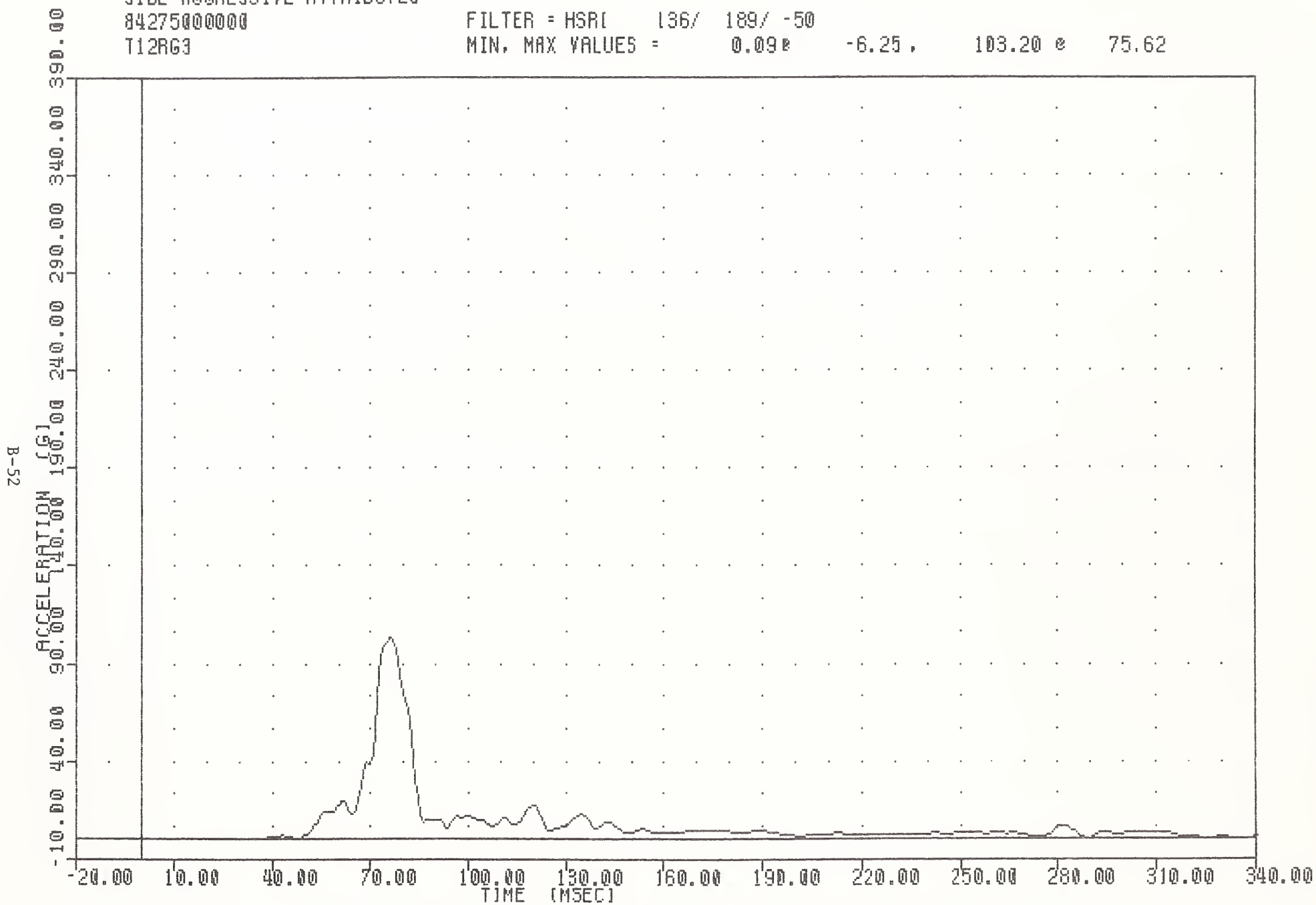
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION Y AXIS



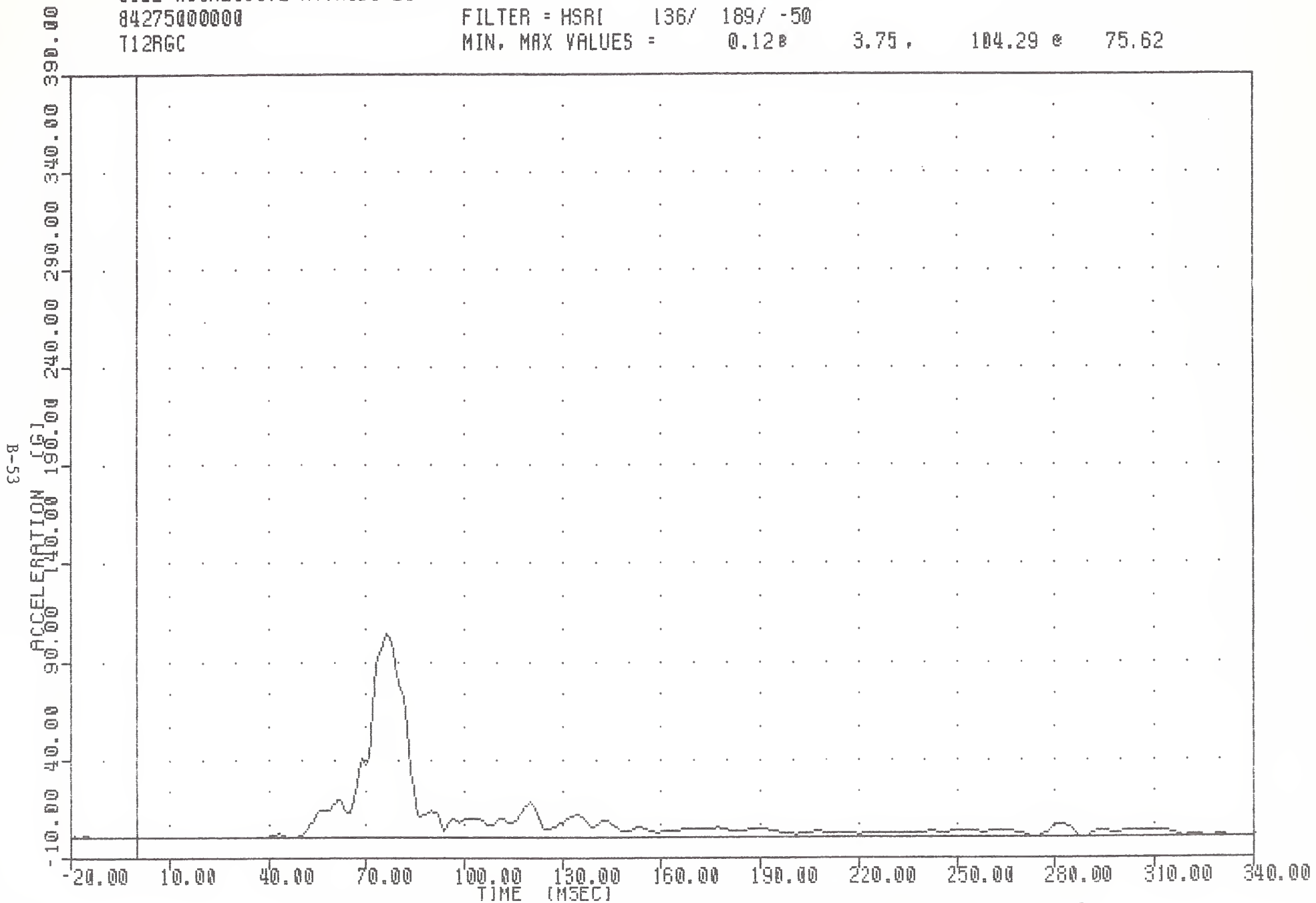
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION -2 Y AXIS



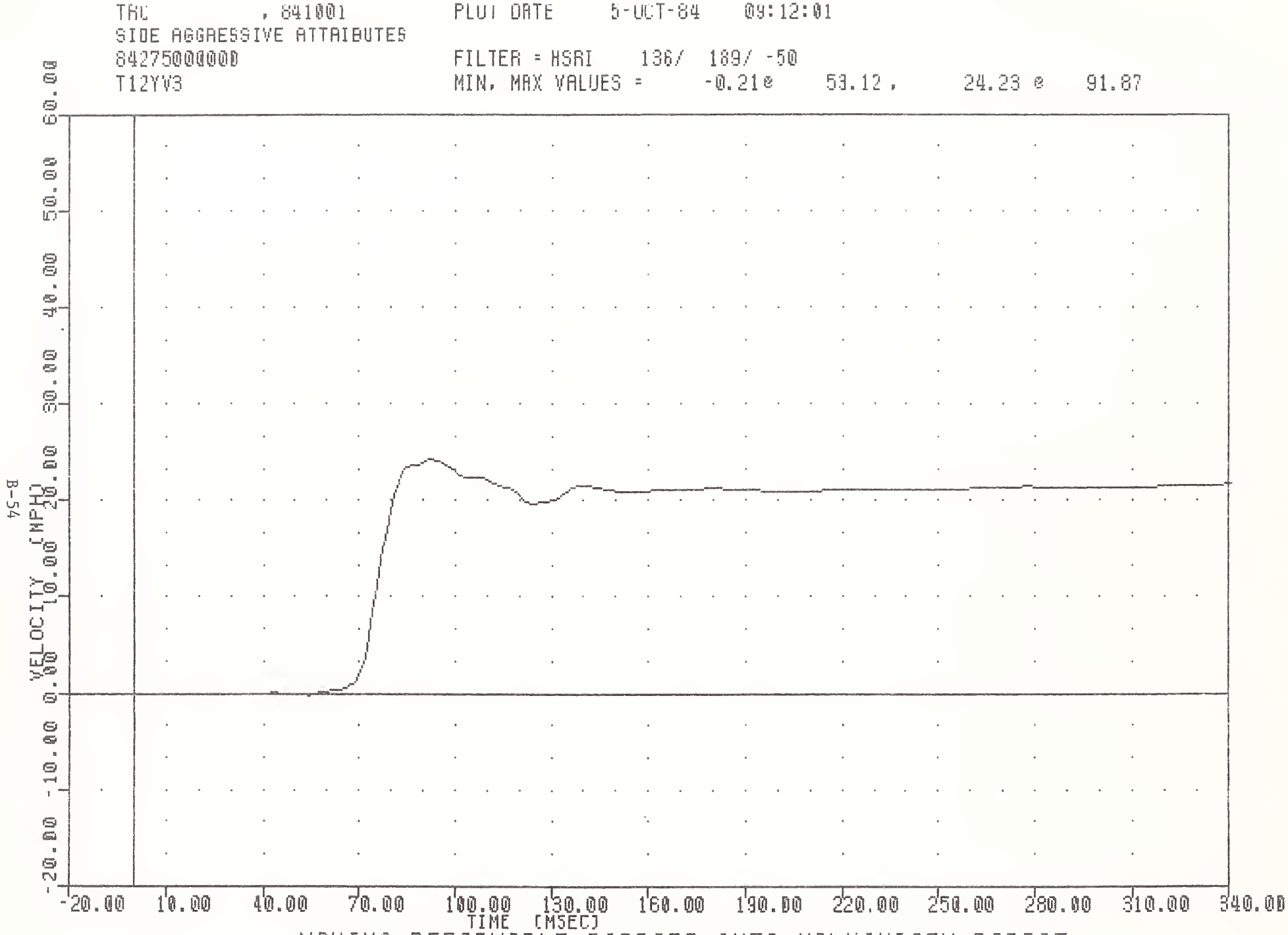
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE ACCELERATION Z AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE RESULTANT

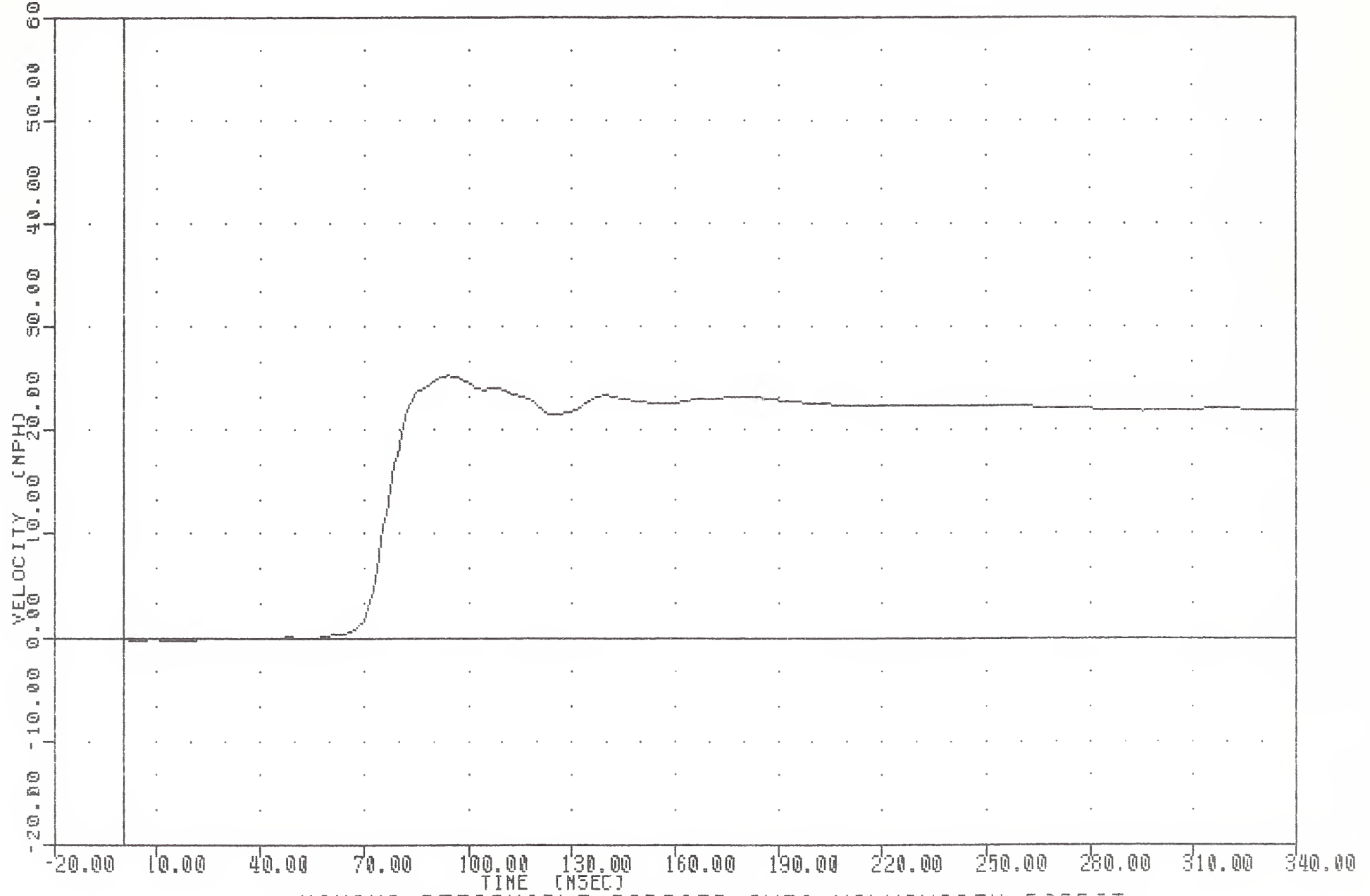


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LOWER SPINE RESULTANT USING T12YGC

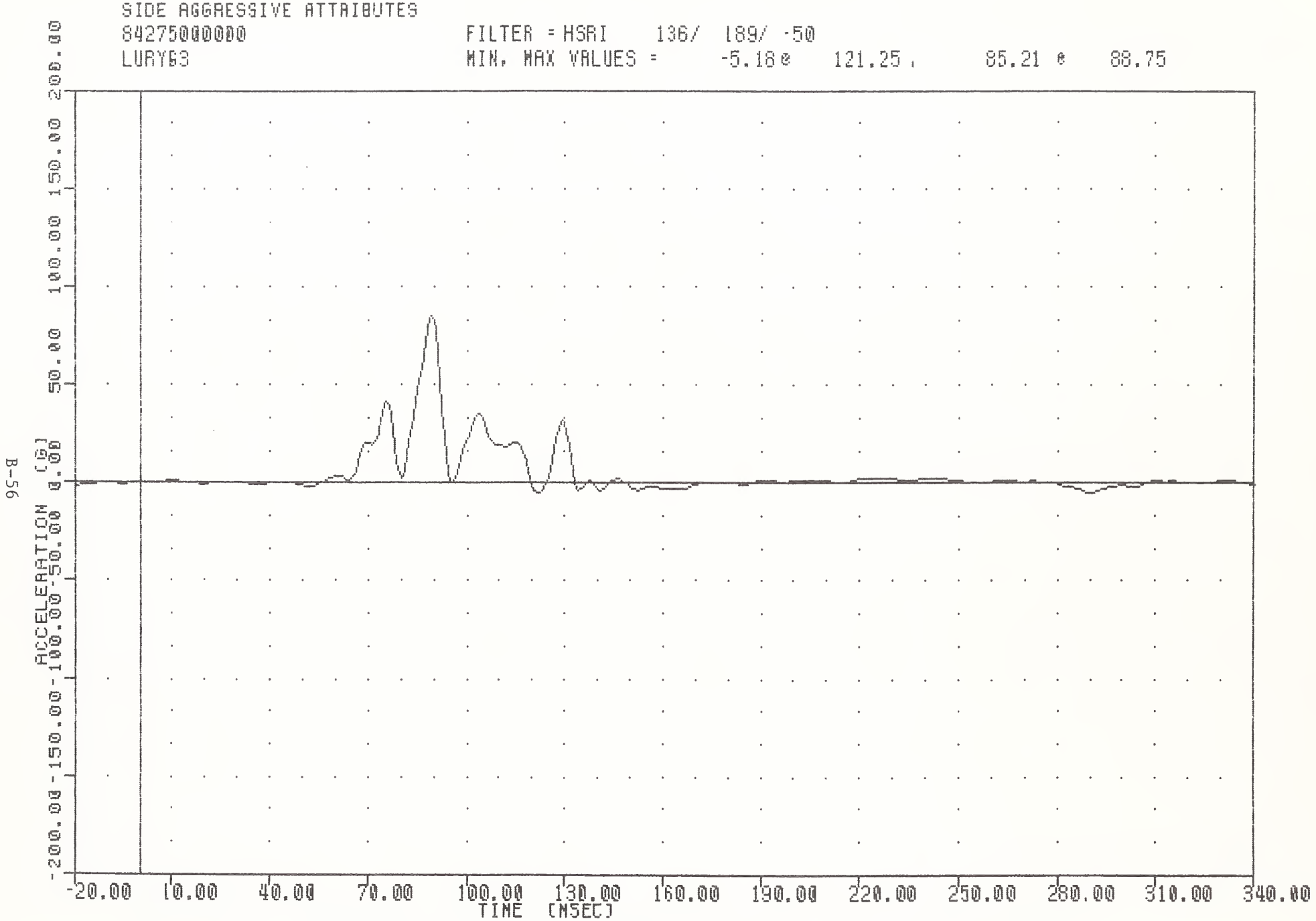


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YG3

TRC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
T12YVC MIN, MAX VALUES = -0.23 @ 14.37 , 25.26 @ 93.13

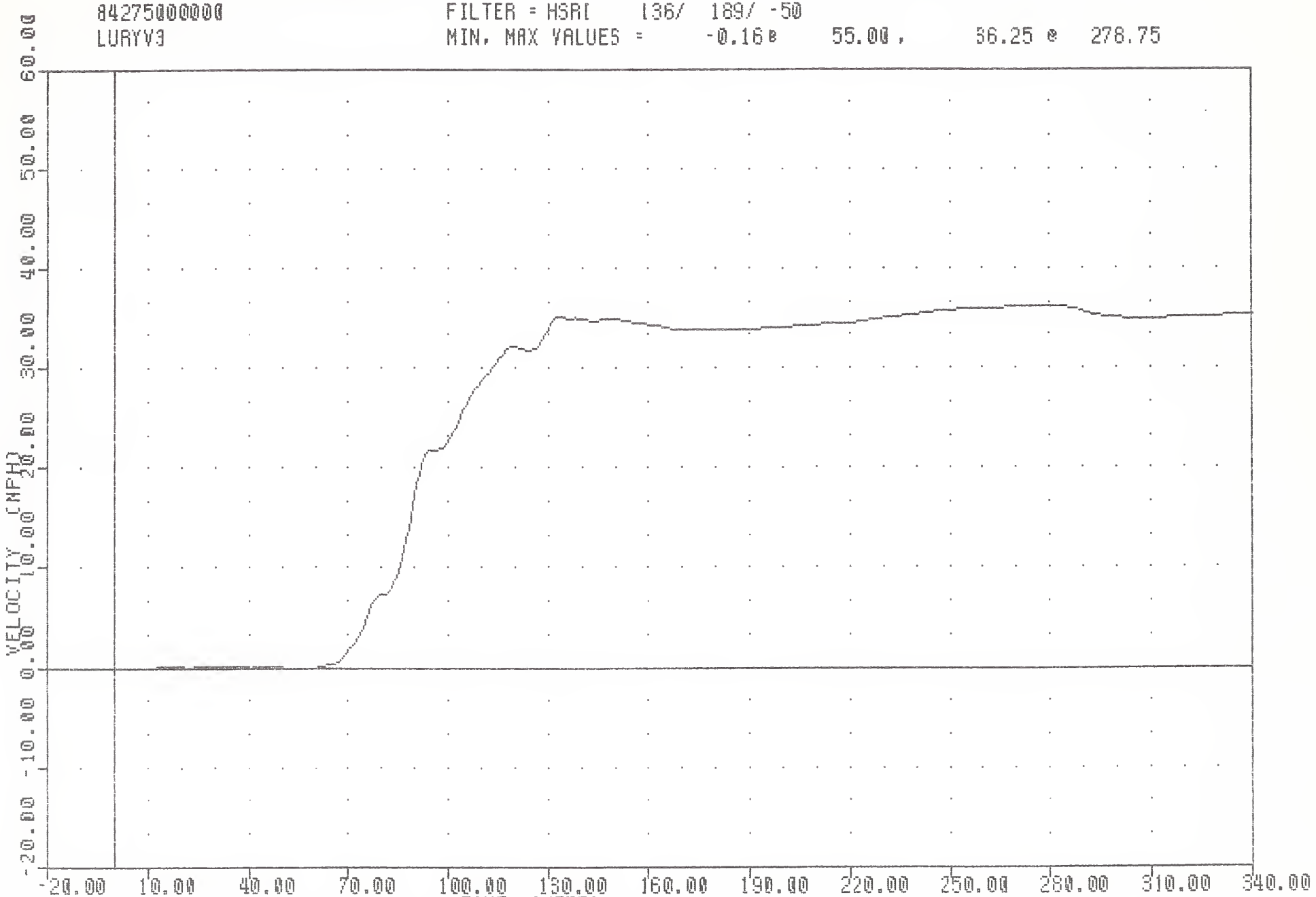


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING T12YGC

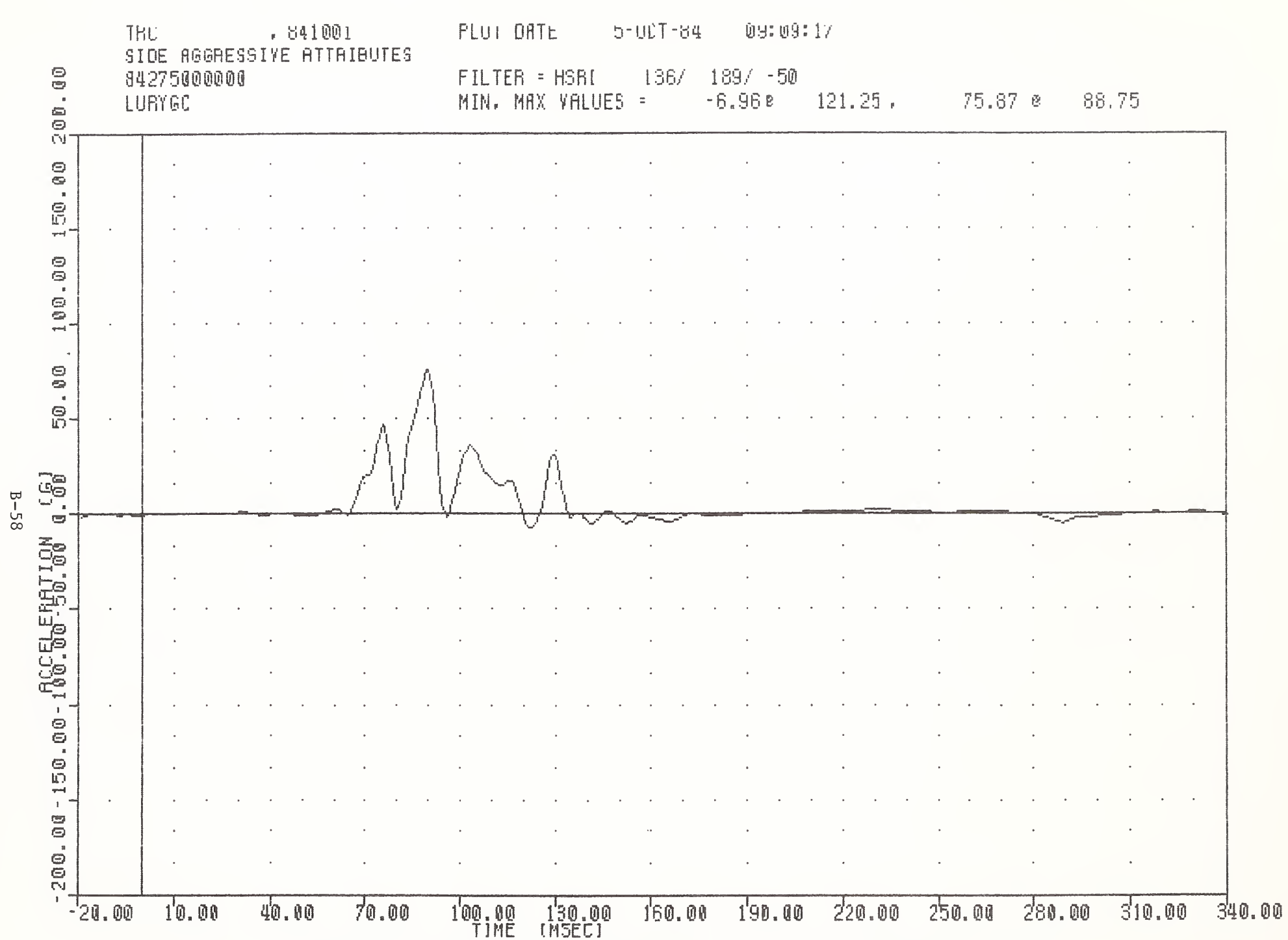


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT UPPER RIB ACCELERATION Y AXIS

TRC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = HSRI 136/ 189/ -50
LURYV3 MIN, MAX VALUES = -0.16 @ 55.00 , 36.25 @ 278.75

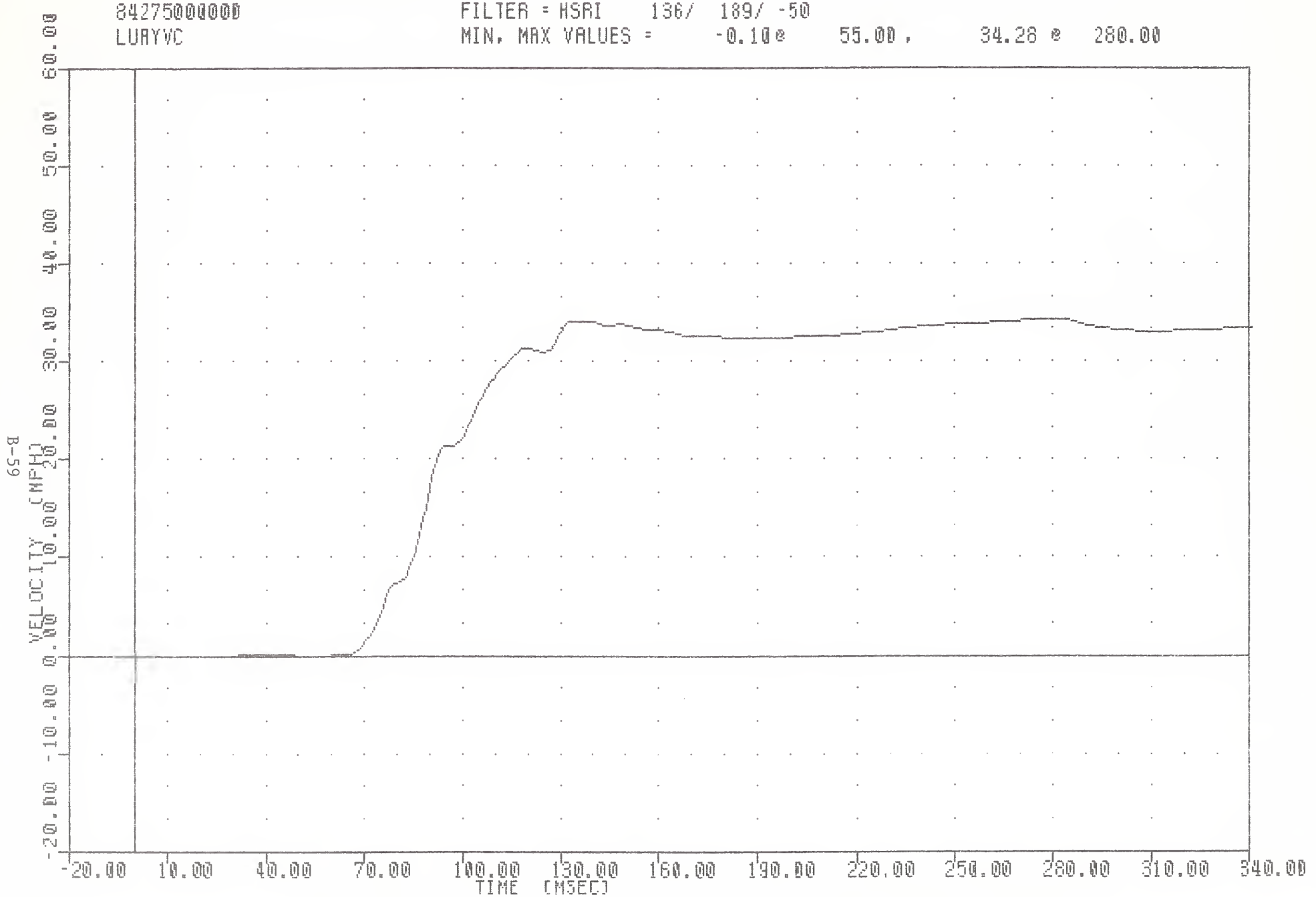


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYG3

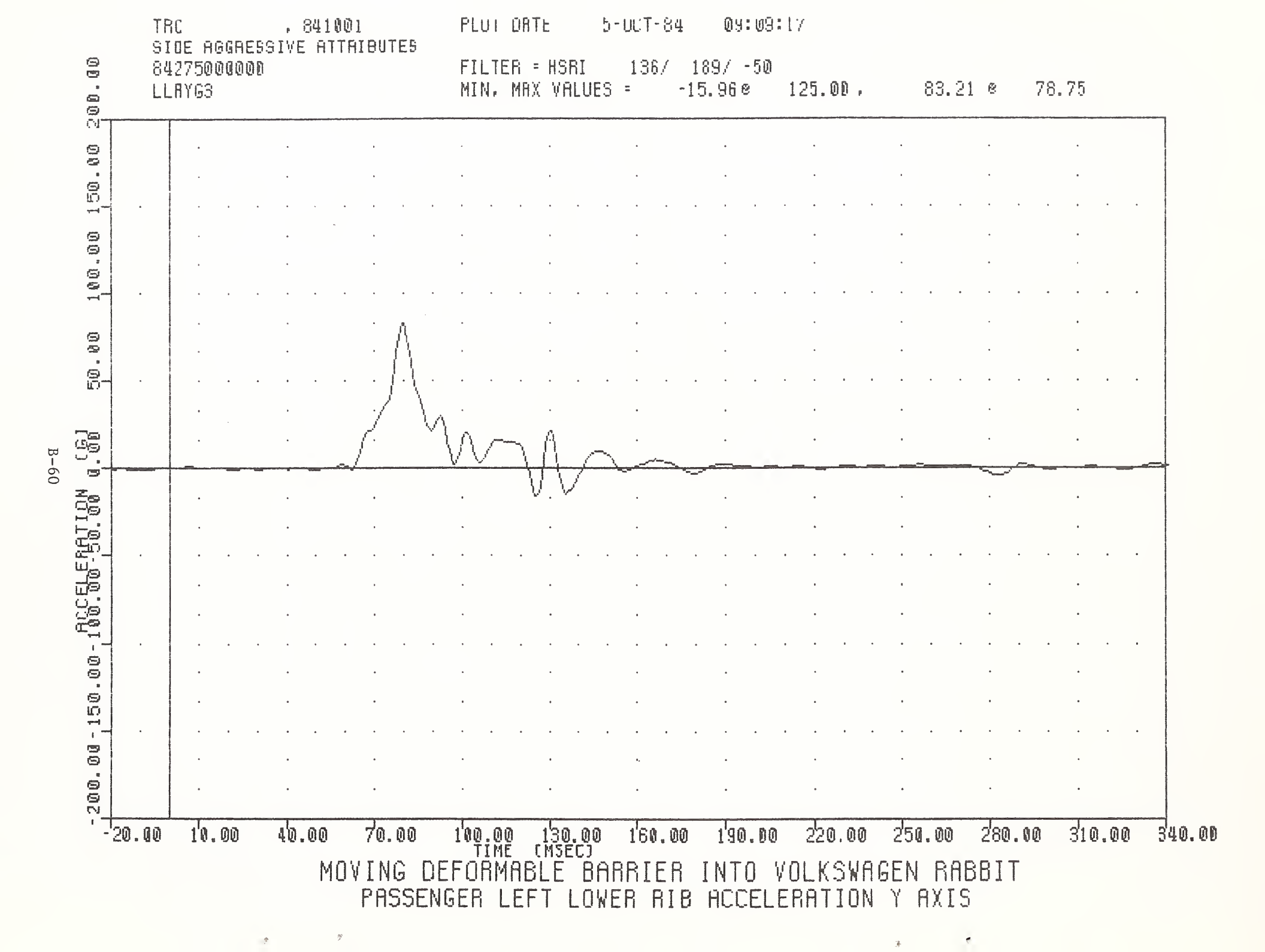


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT UPPER RIB ACCELERATION -2 Y AXIS

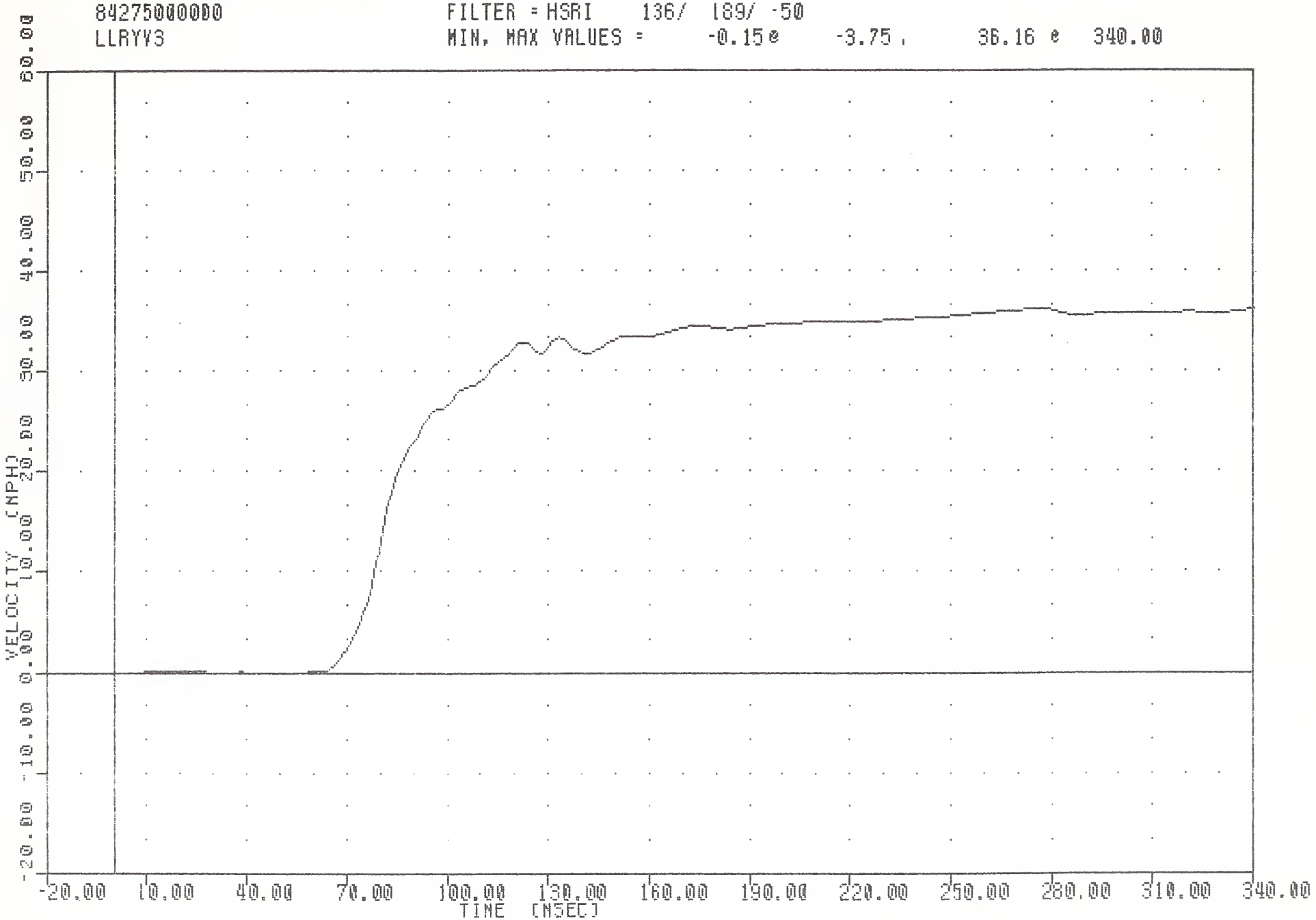
TRC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = HSRI 136/ 189/ -50
LURYVC MIN, MAX VALUES = -0.10 @ 55.00 , 34.28 @ 280.00



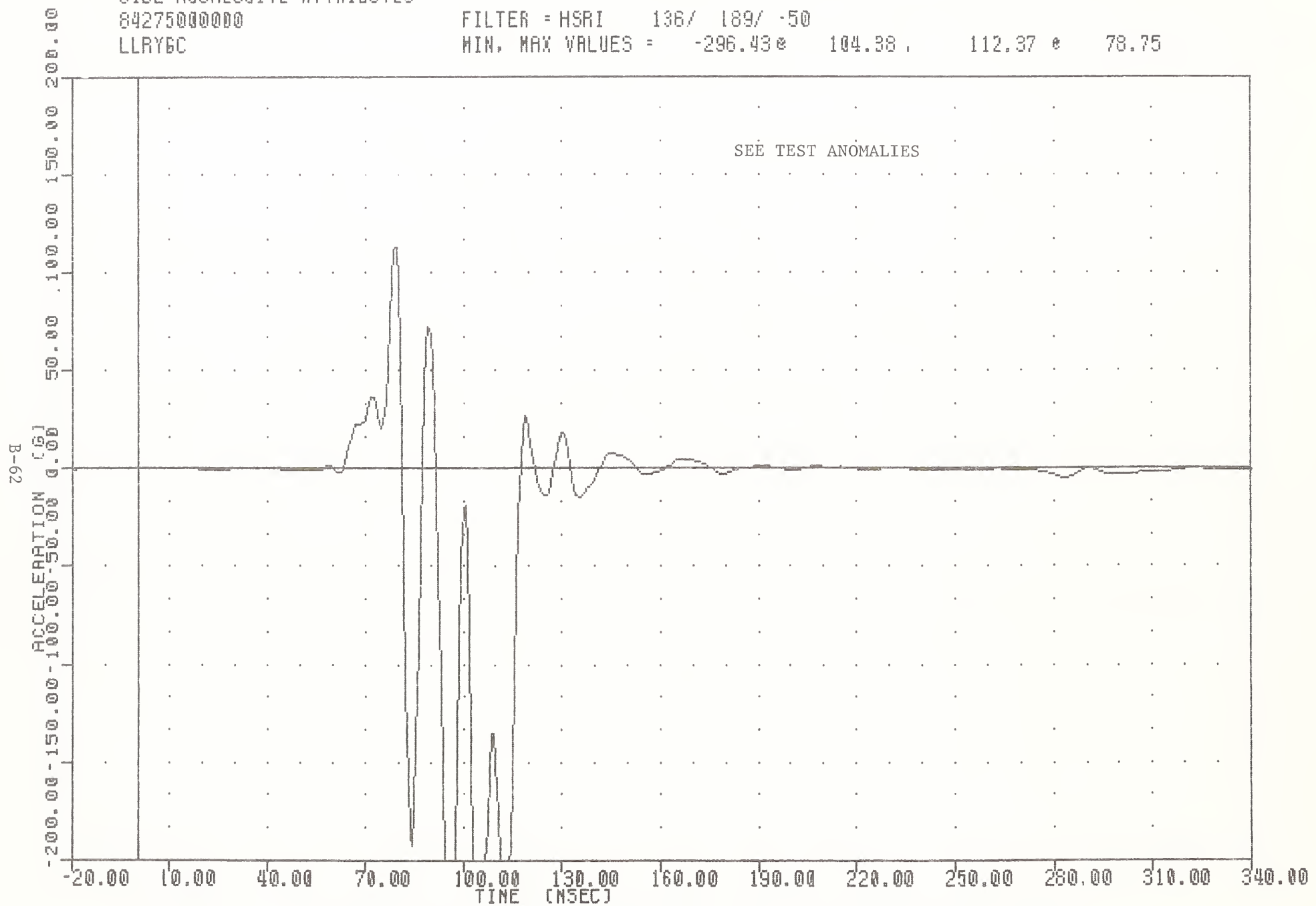
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LURYGC


TRC , 841001
PLOT DATE 5-OCT-84 09:09:17
SIDE AGGRESSIVE ATTRIBUTES
84275000000
FILTER = HSRI 136/ 189/ -50
LLAYG3
MIN, MAX VALUES = -15.96 @ 125.00 , 83.21 @ 78.75
ACCELERATION (G)
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
-20.00
10.00
40.00
70.00
100.00
130.00
160.00
190.00
220.00
250.00
280.00
310.00
340.00
TIME (MSEC)
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT LOWER RIB ACCELERATION Y AXIS

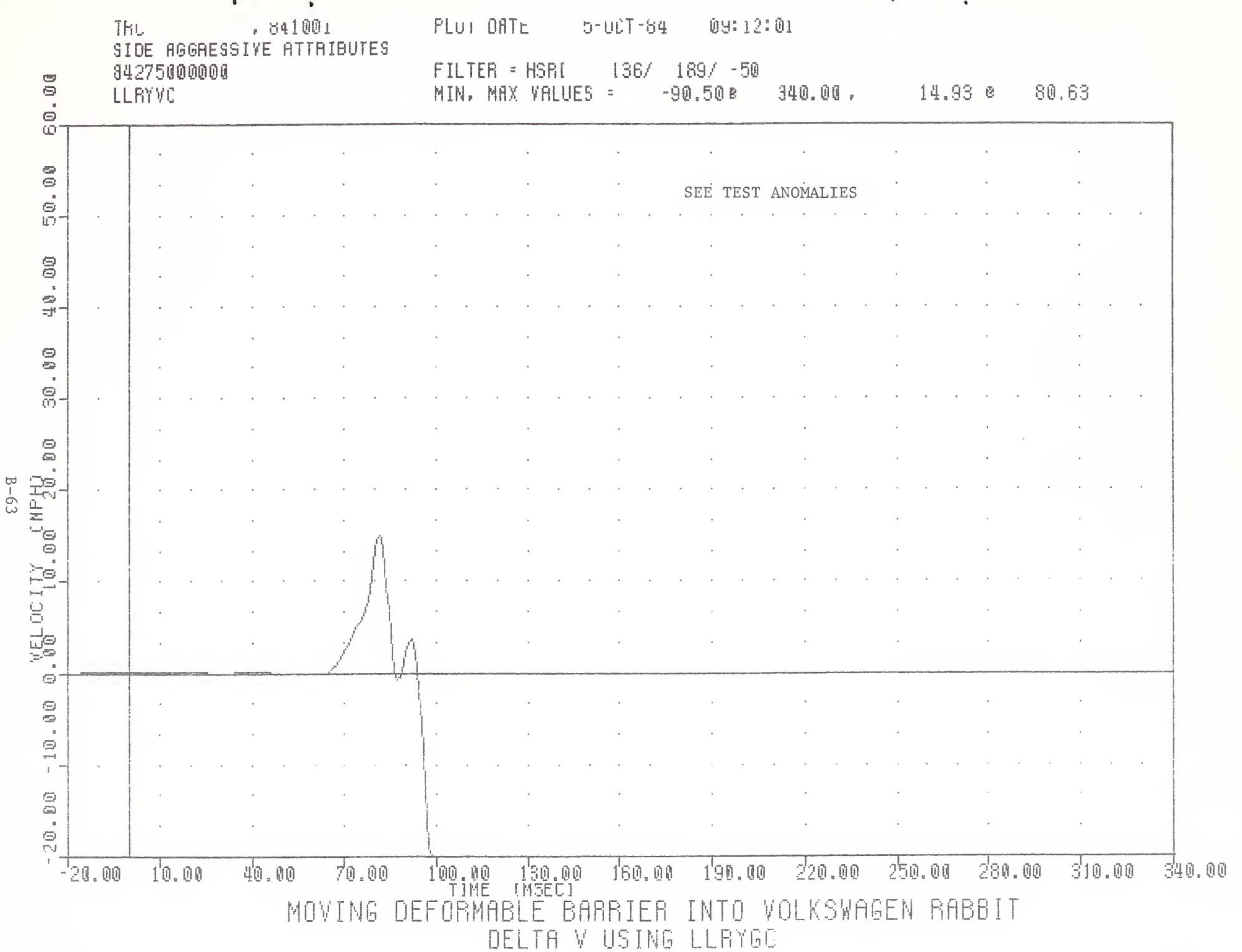
TAC , 841001 PLOT DATE 5-OCT-84 09:12:01
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = HSRI 136/ 189/ -50
LLRYV3 MIN, MAX VALUES = -0.15 @ -3.75 , 36.16 @ 340.00



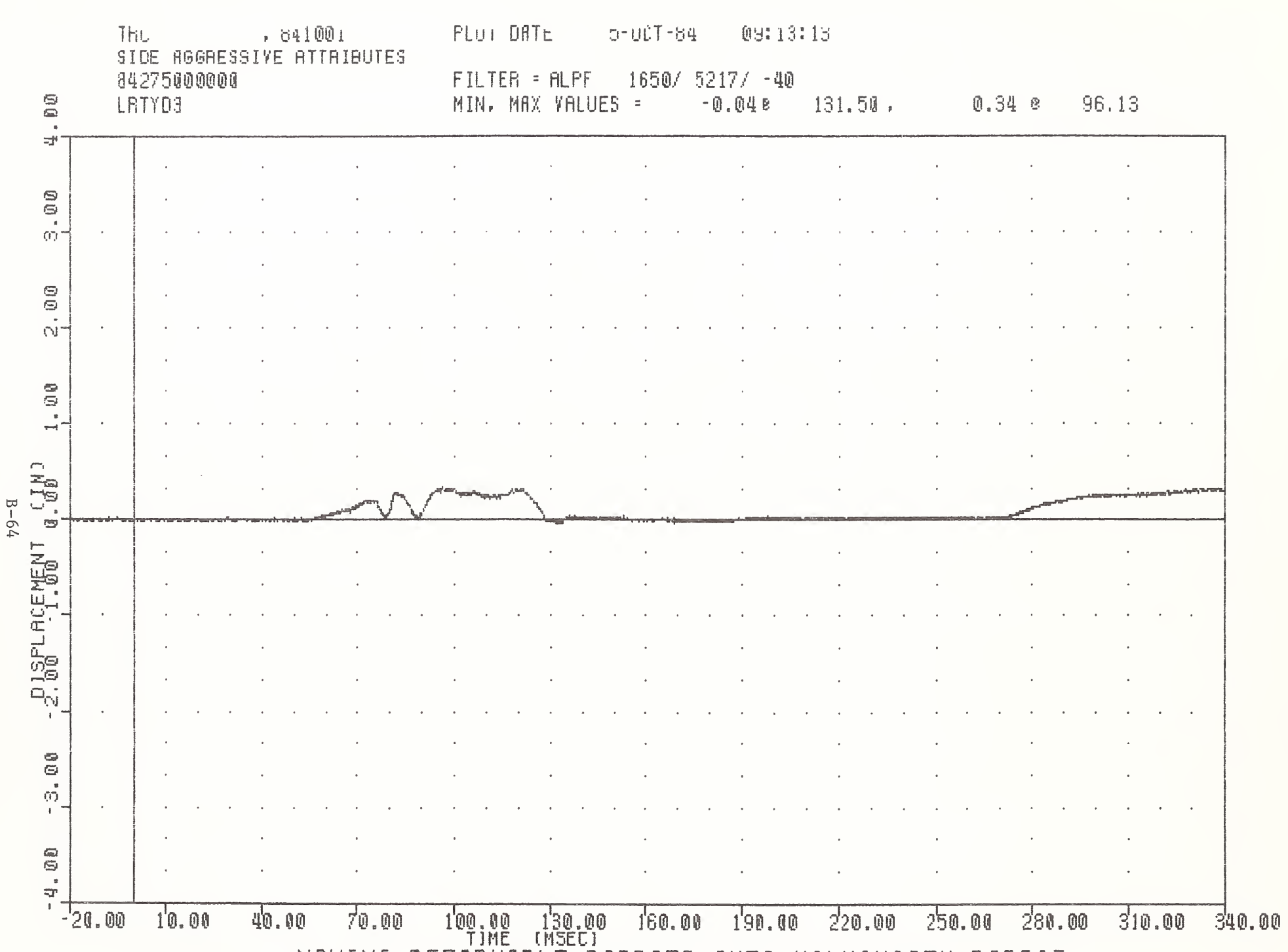
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYG3



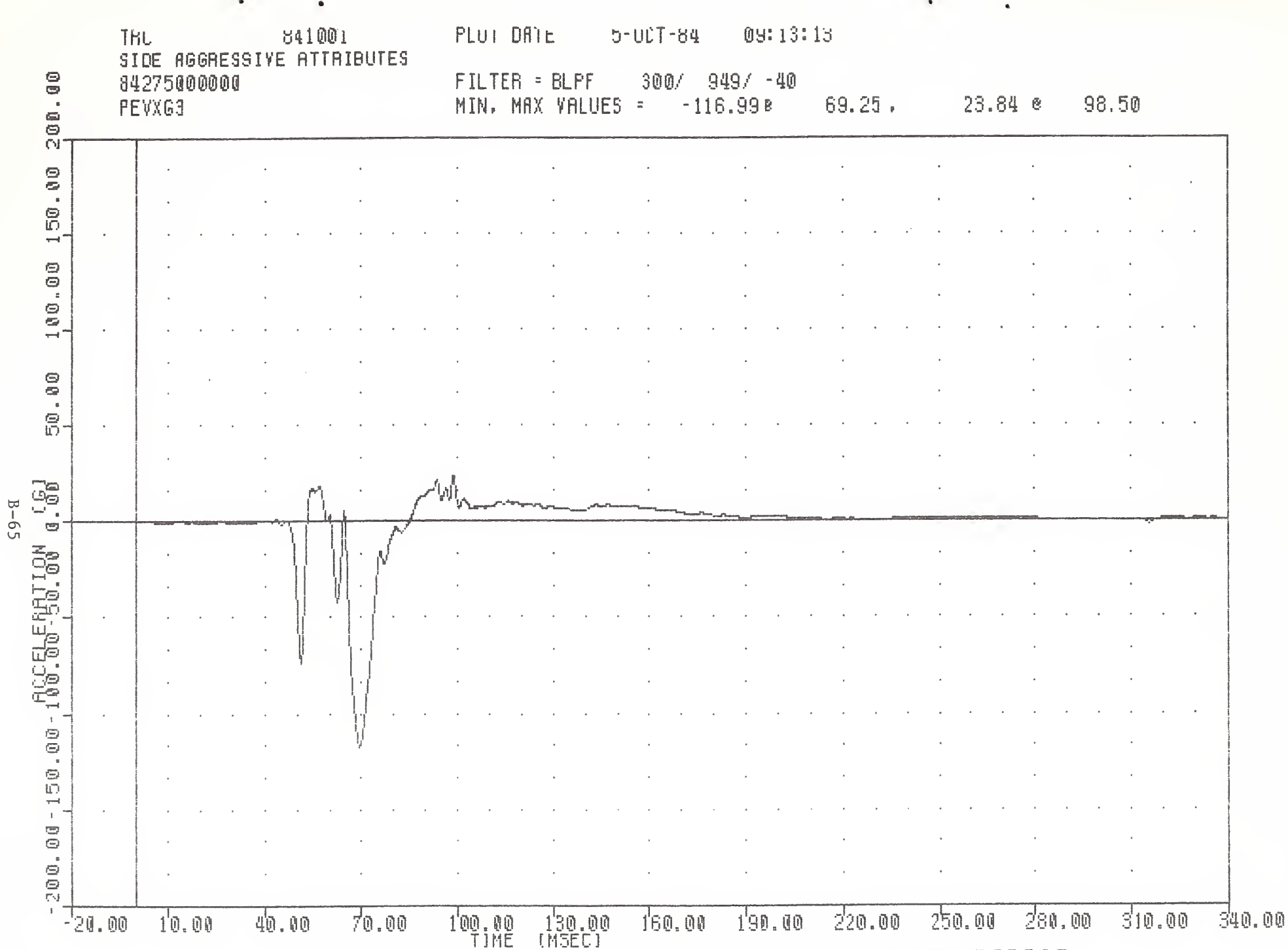
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT LOWER RIB ACCELERATION -2 Y AXIS



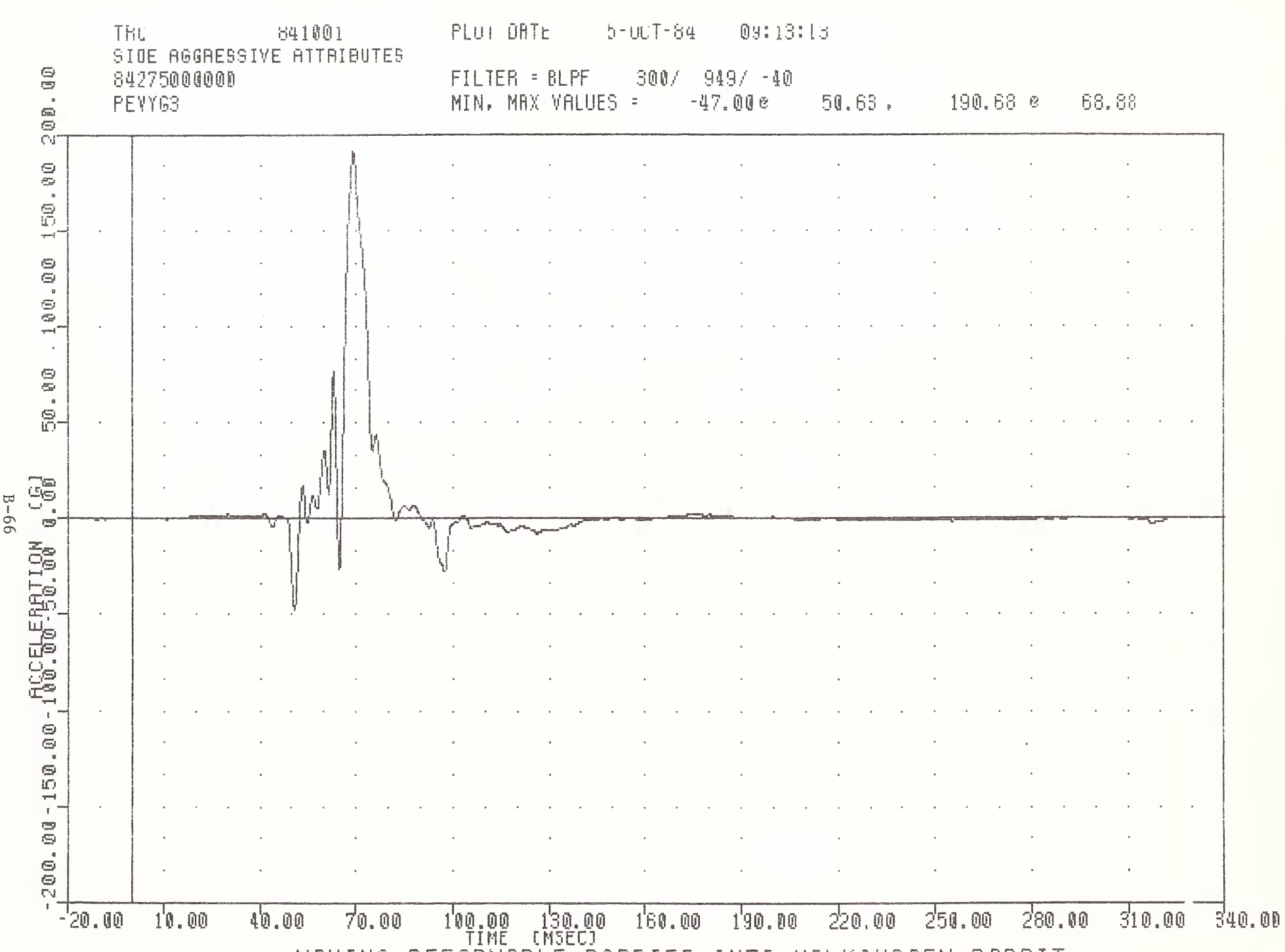
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LLRYGC



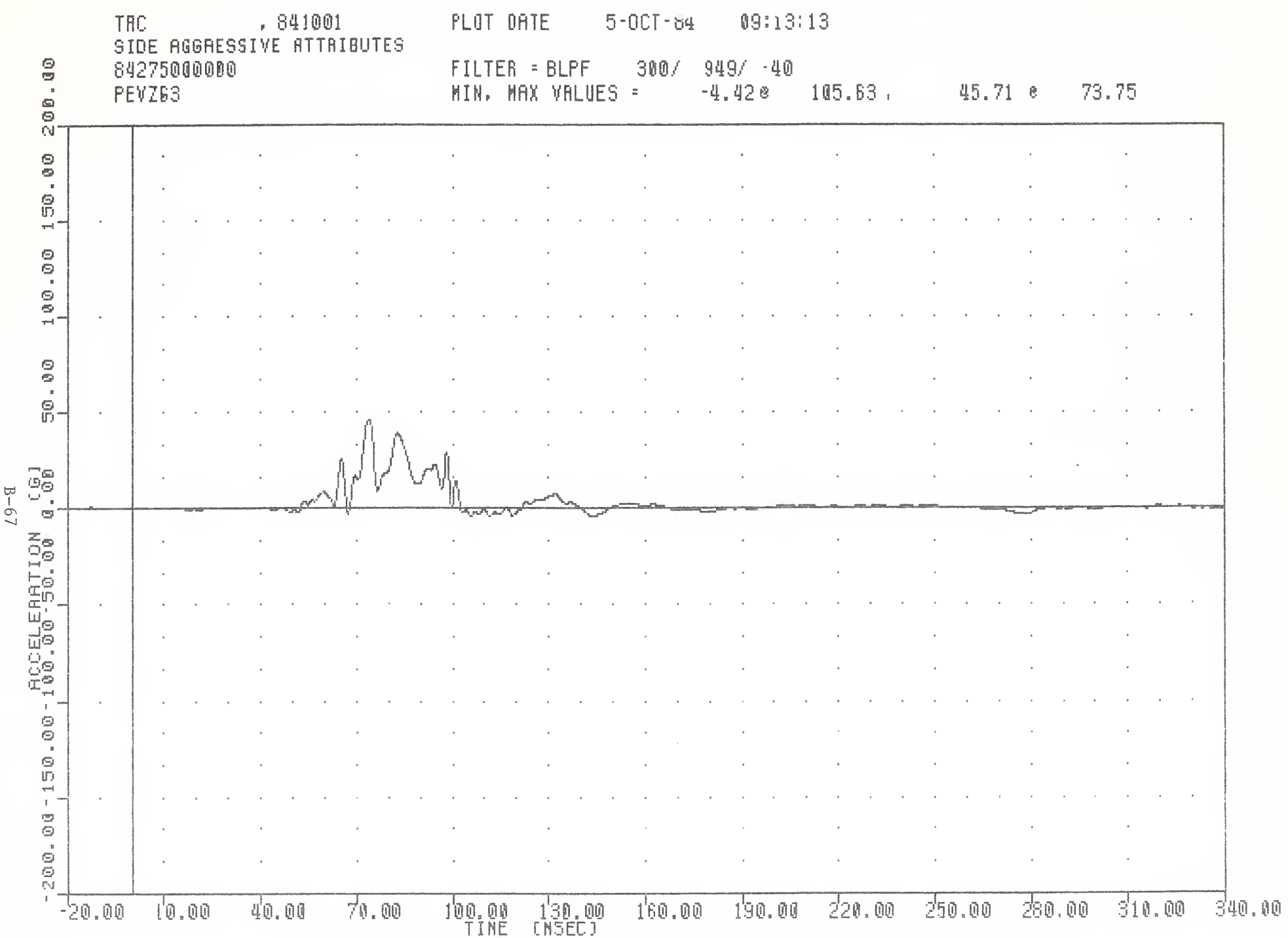
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER LEFT RIB TO SPINE DISPLACEMENT INCHES



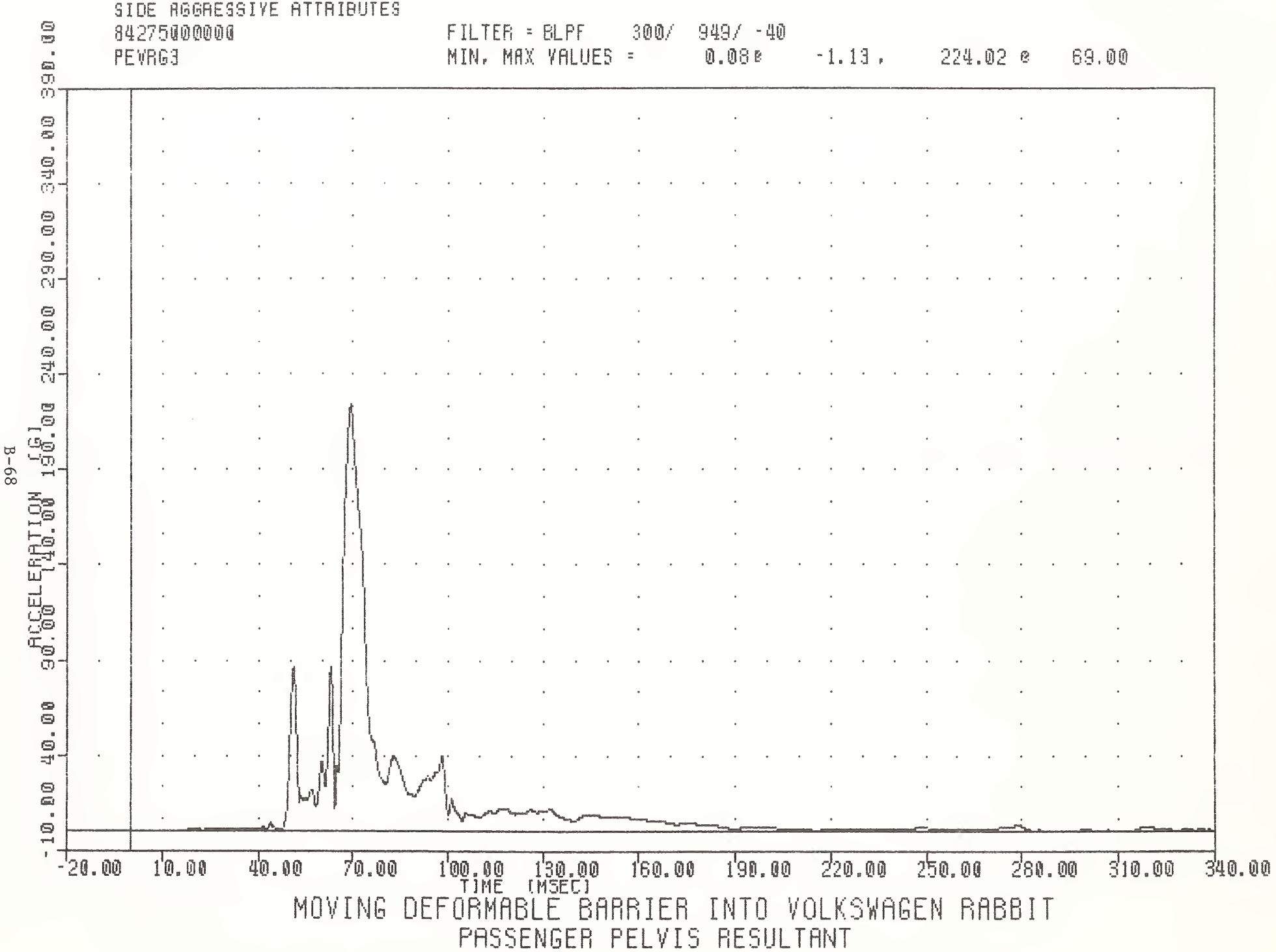
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION X AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION Y AXIS

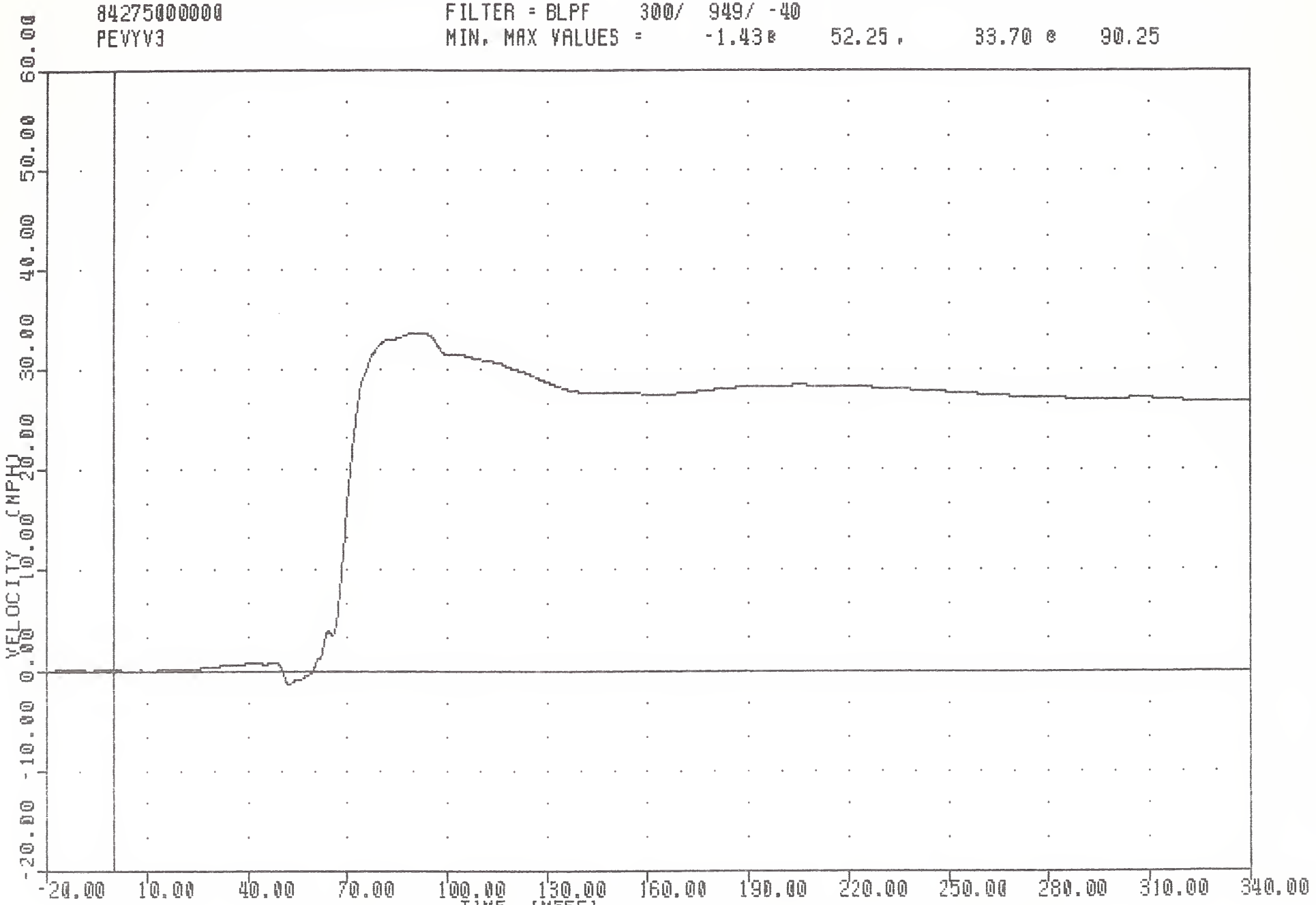


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS ACCELERATION Z AXIS

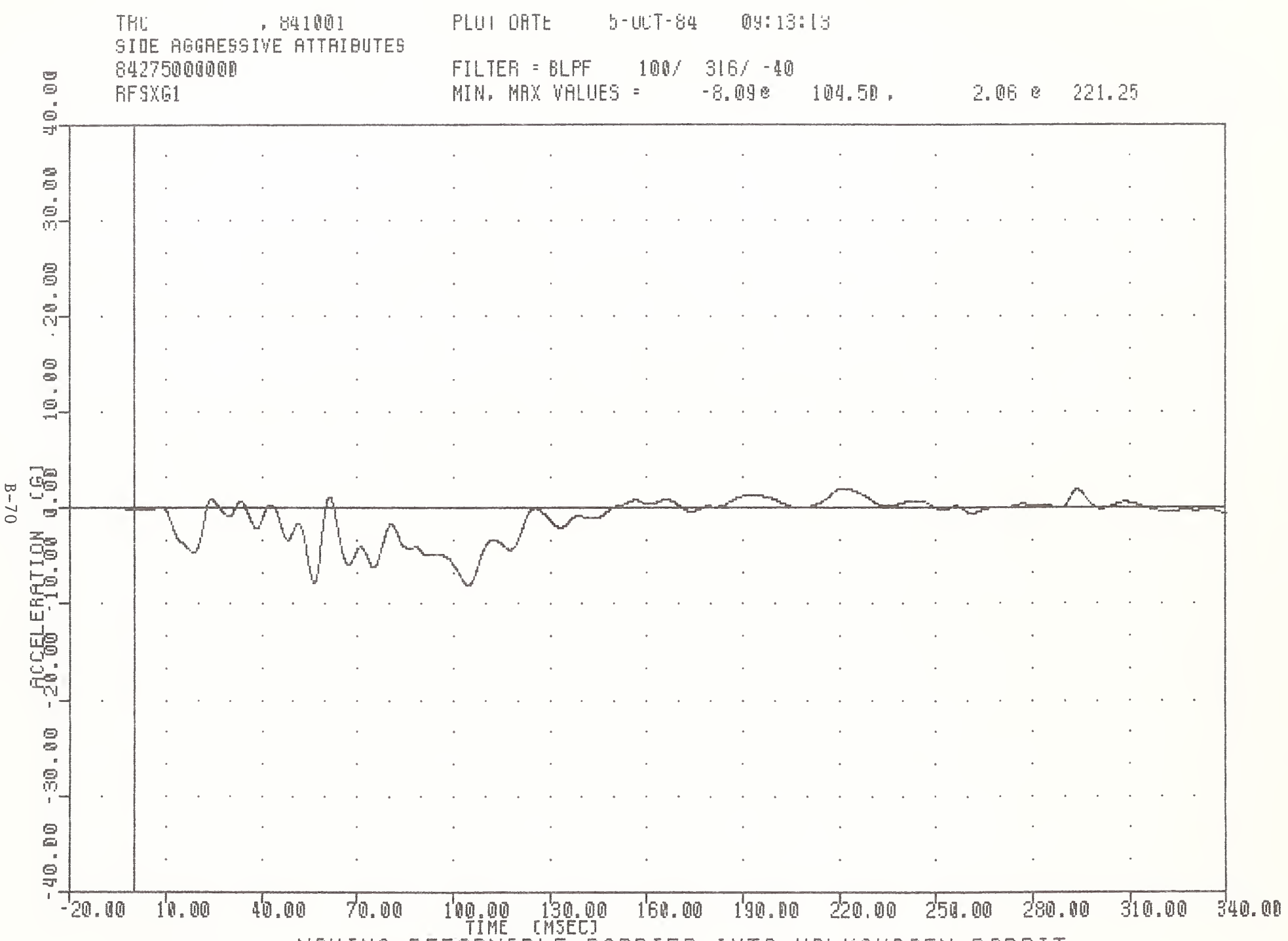


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
PASSENGER PELVIS RESULTANT

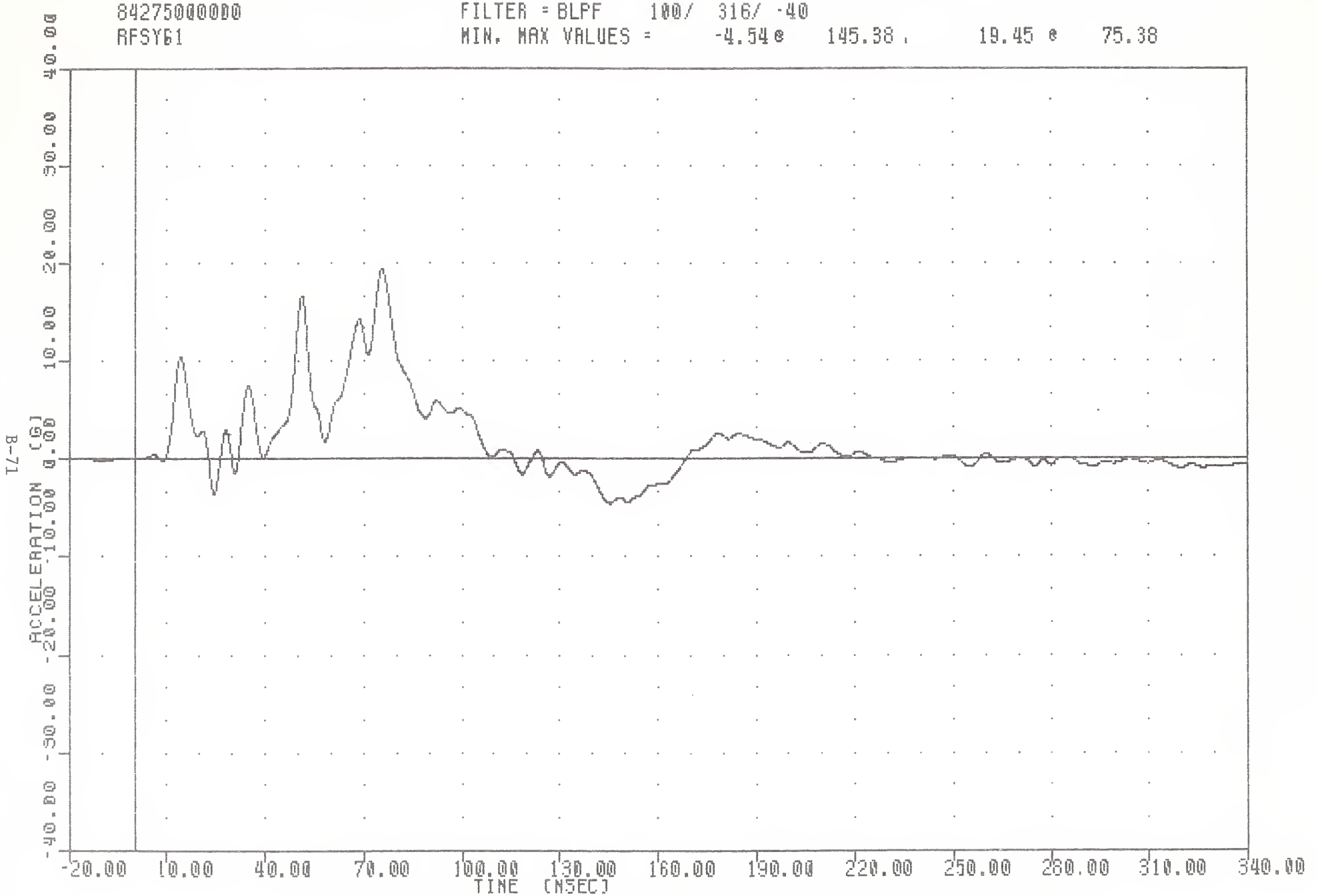
TRC , 841001 PLOT DATE 5-OCT-84 09:14:49
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = BLPF 300/ 949/ -40
PEVYV3 MIN, MAX VALUES = -1.43 @ 52.25 , 33.70 @ 90.25



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING PEVYG3

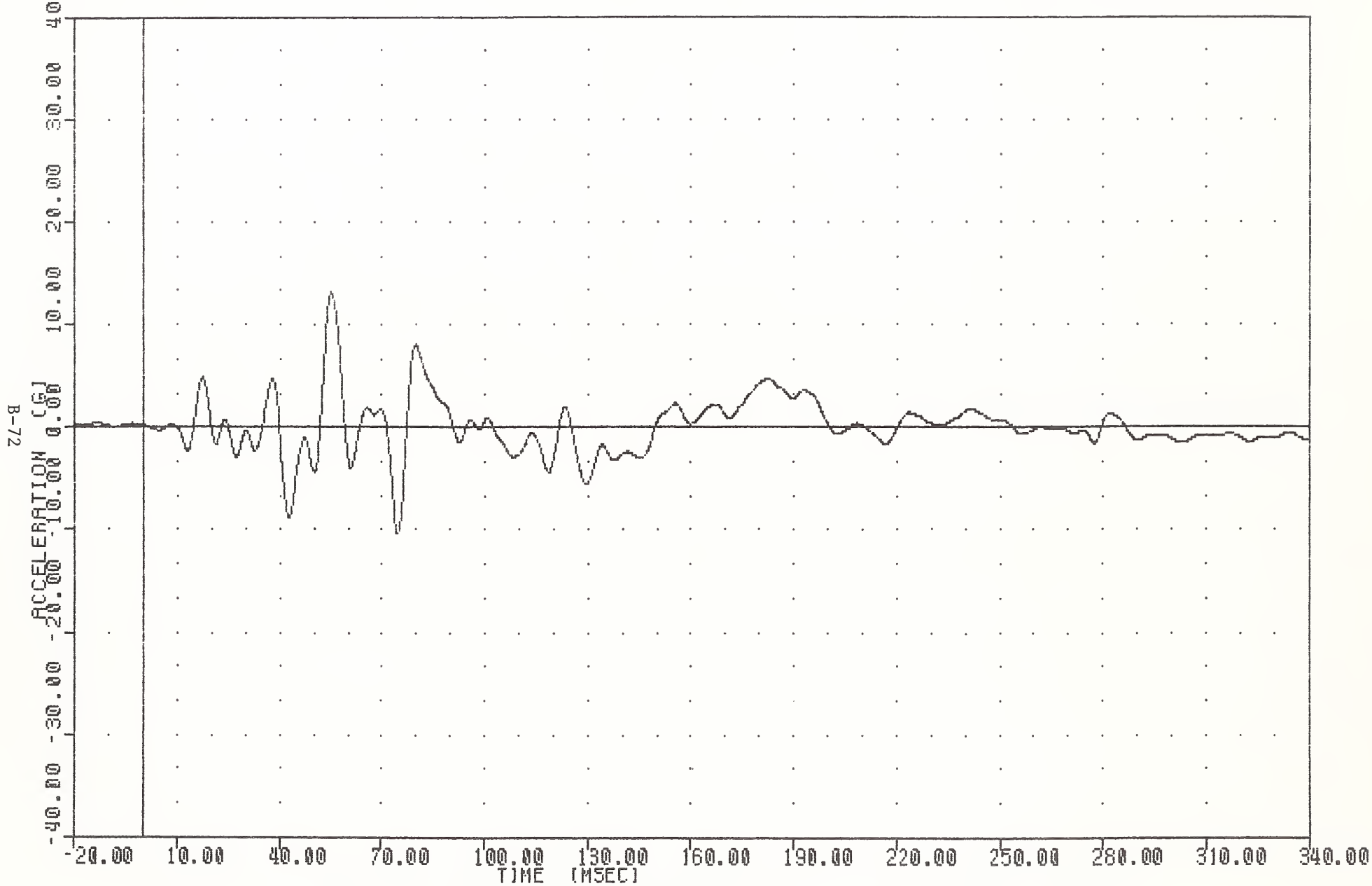


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION X AXIS

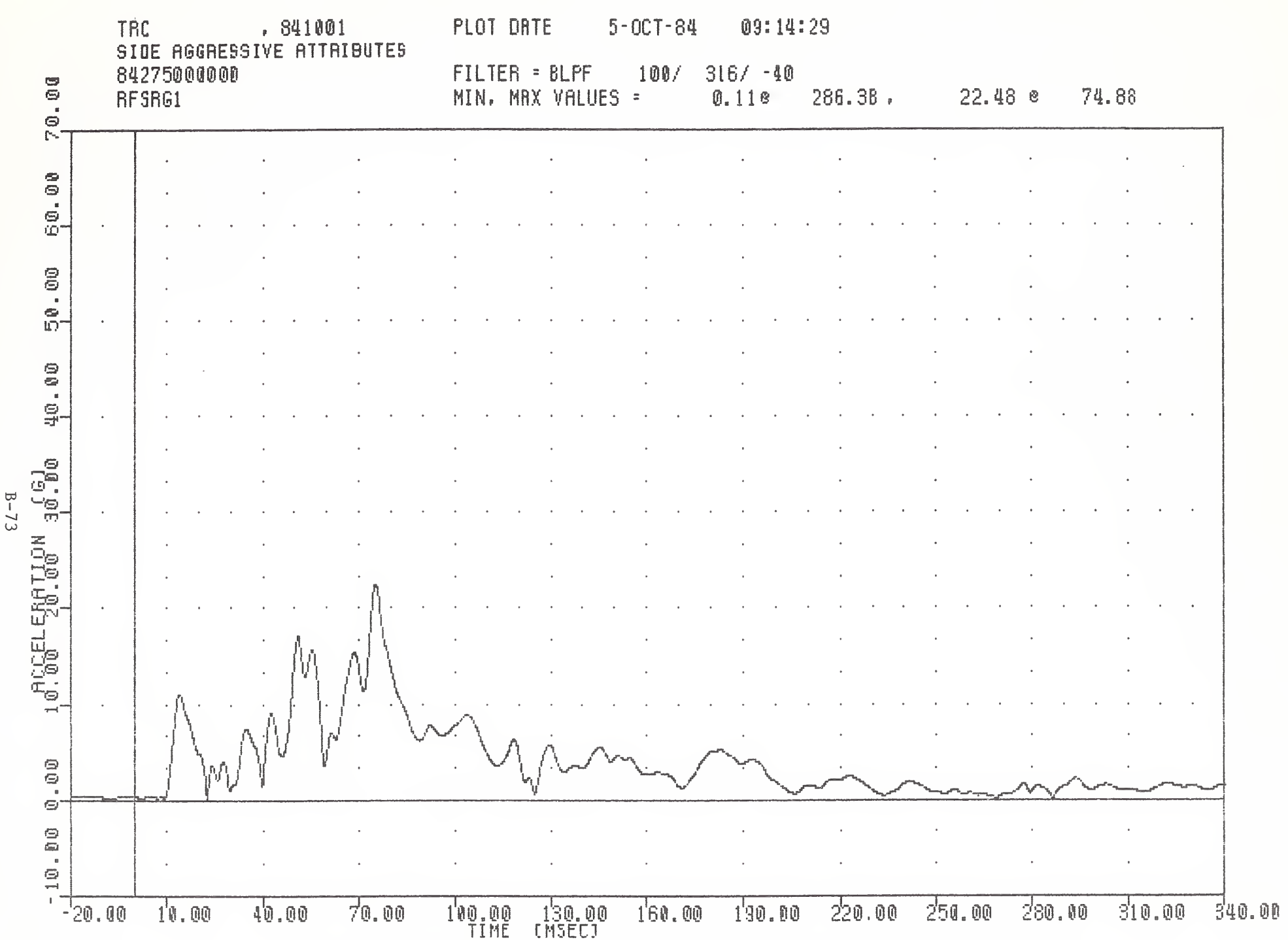


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION Y AXIS

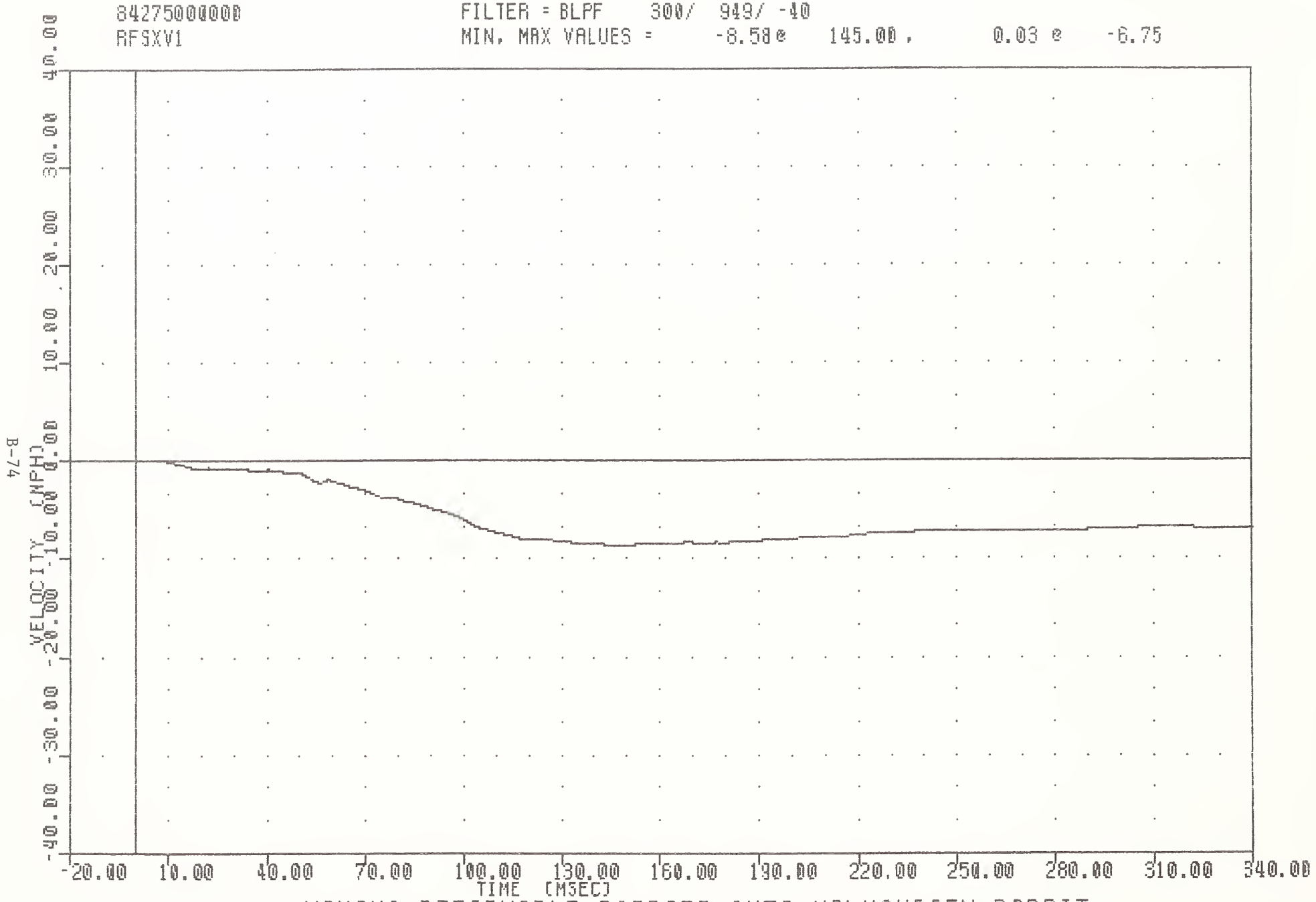
TRC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 100/ 316/ -40
RFSZG1 MIN, MAX VALUES = -10.42 @ 74.38 , 13.11 @ 55.00



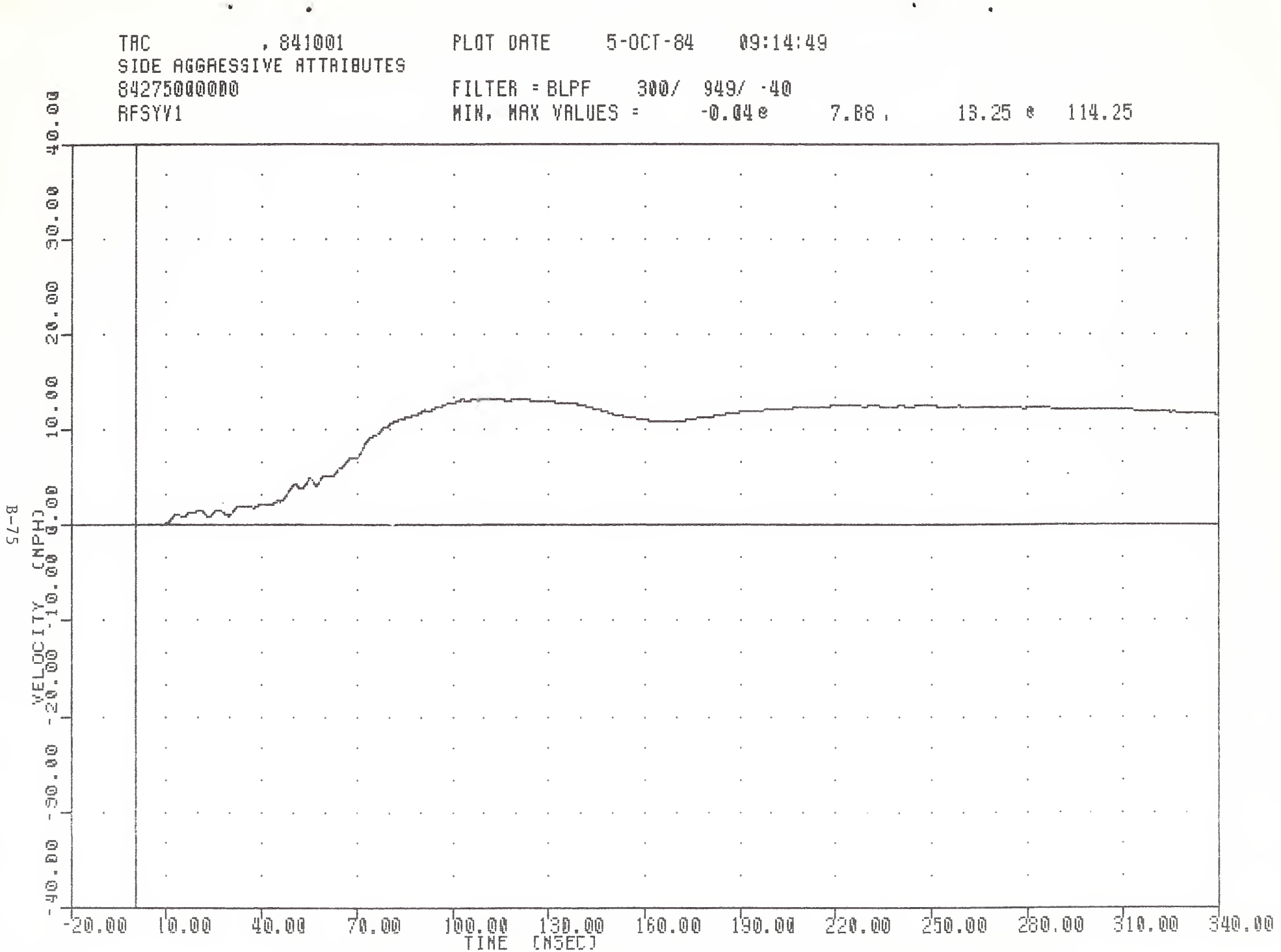
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL ACCELERATION Z AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT FRONT SILL RESULTANT

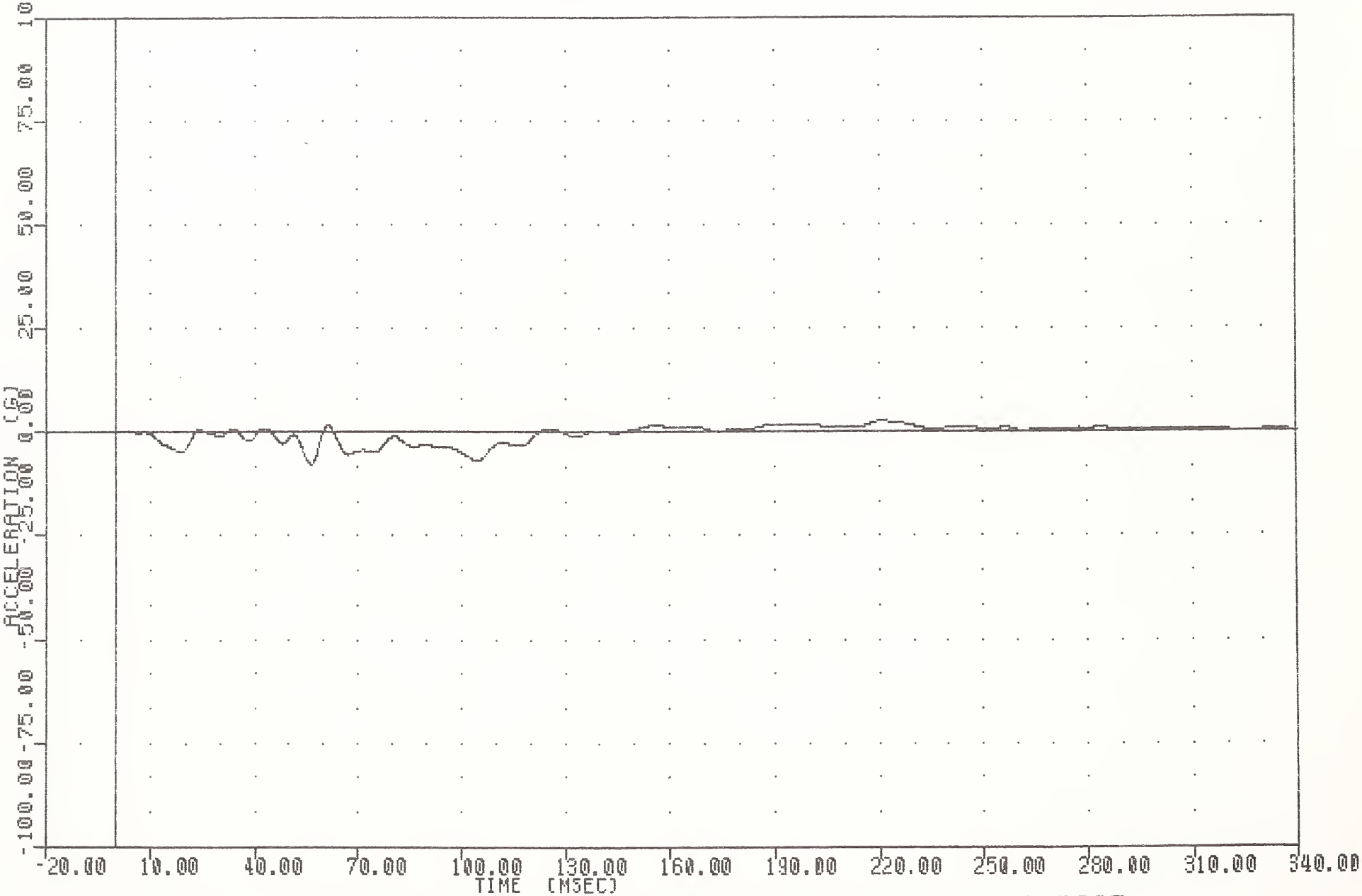


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RFSXG1



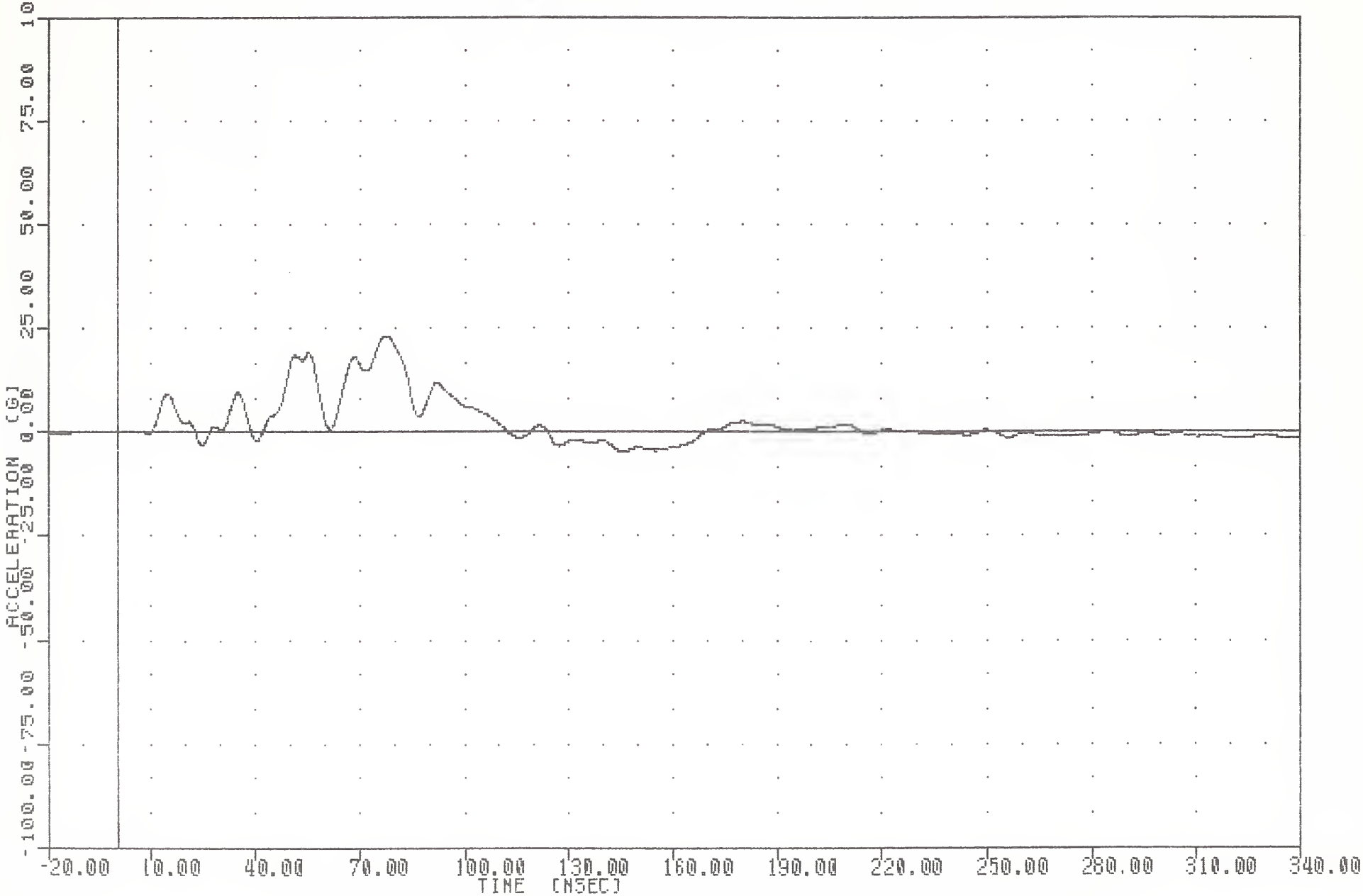
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RFSYG1

TRC 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 100/ 316/ -40
RRSXG2 MIN, MAX VALUES = -7.81@ 56.38 , 2.66 @ 220.63

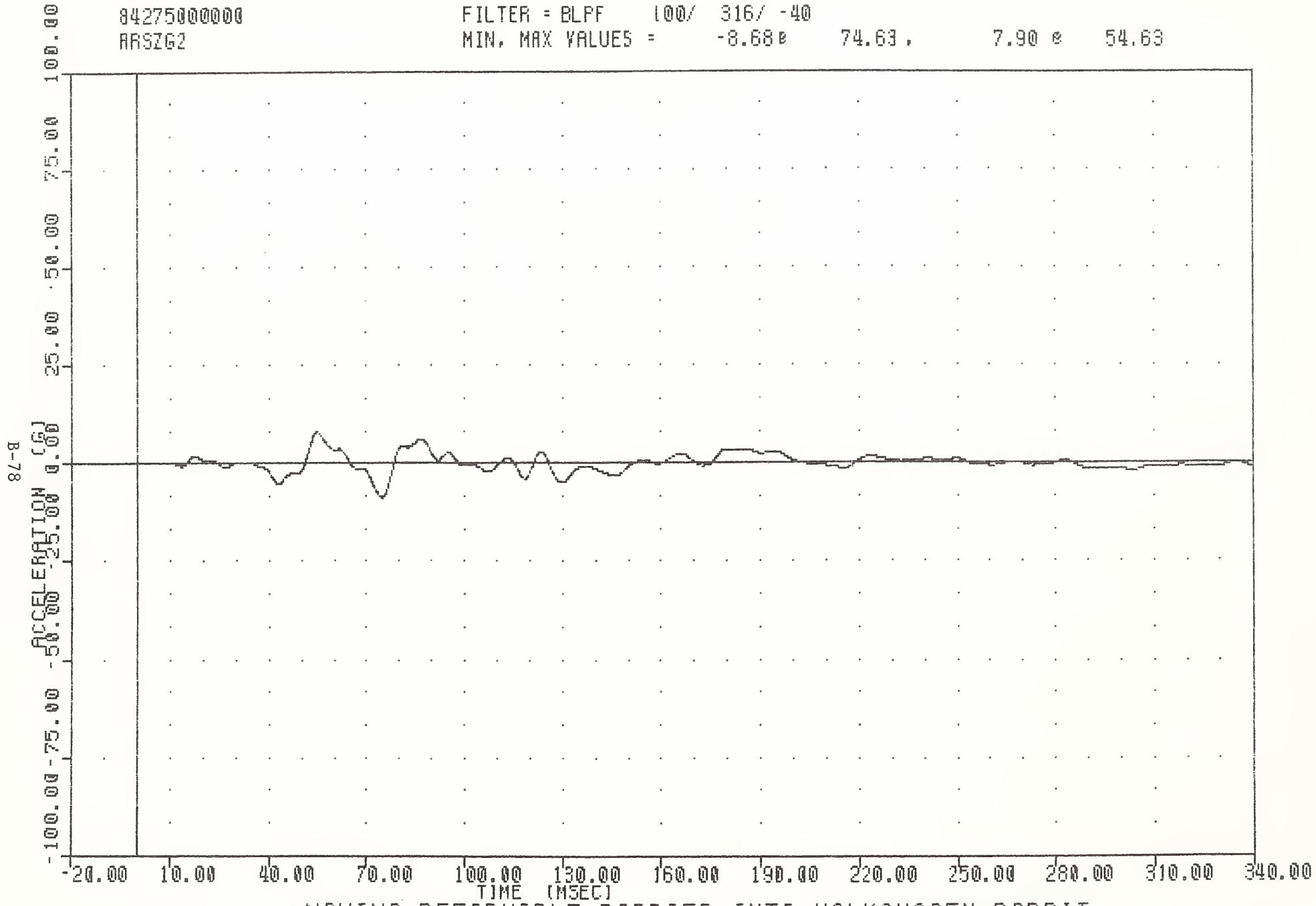


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION X AXIS

TAC 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
842750@0000 FILTER = BLPF 100/ 316/ -40
RASY62 MIN, MAX VALUES = -4.81 @ 145.50 , 23.15 @ 77.50

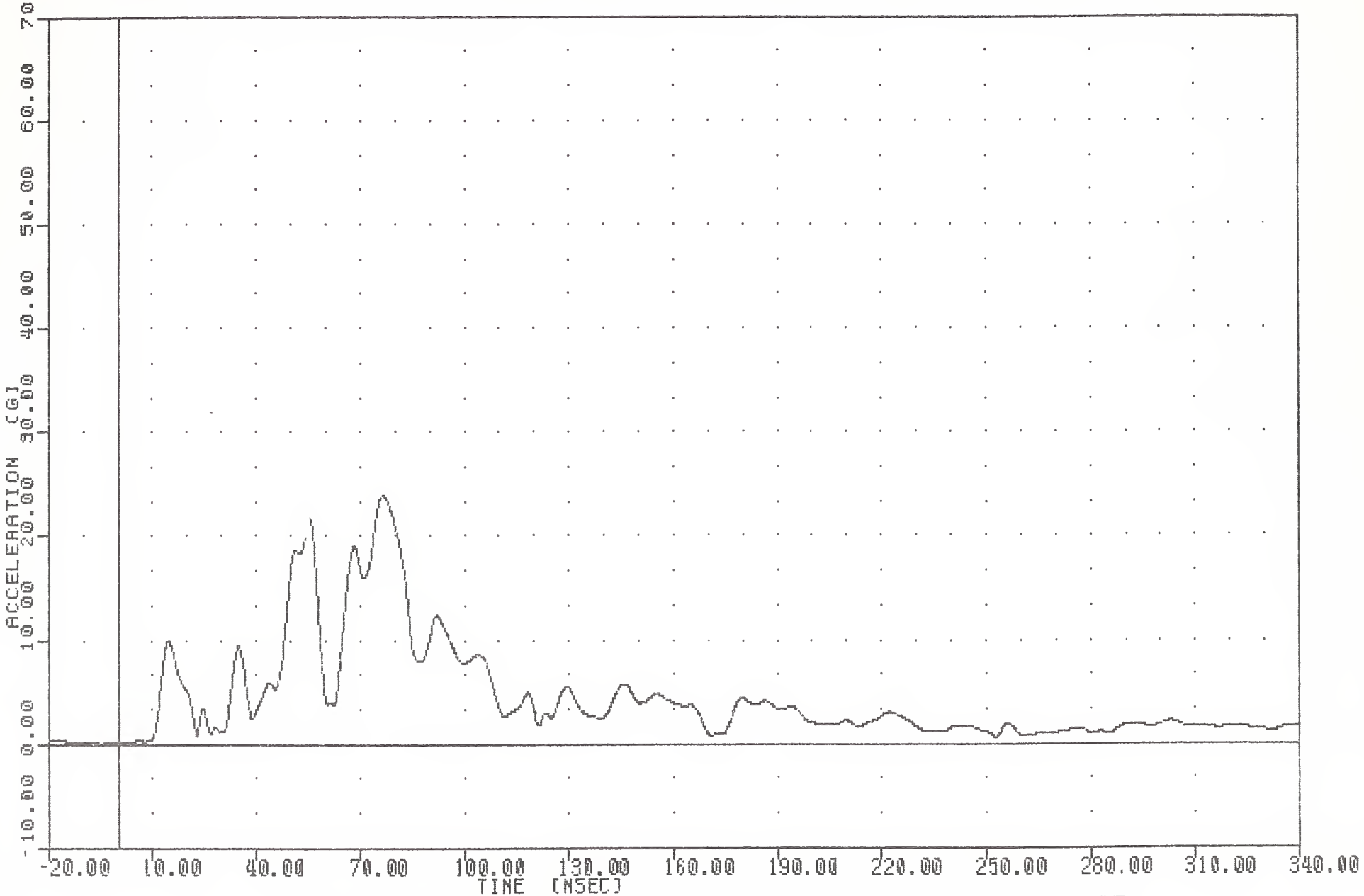


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION Y AXIS

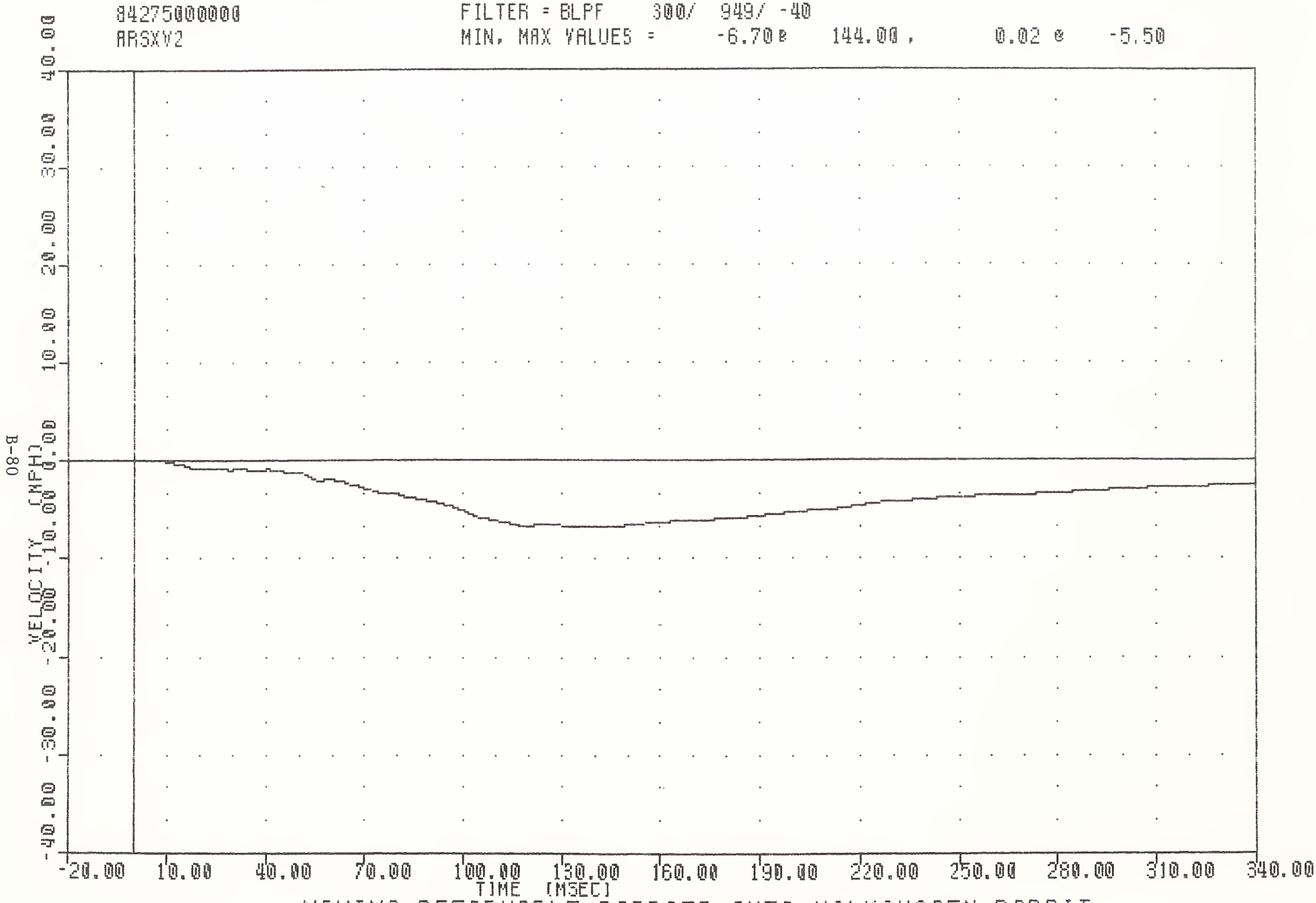


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL ACCELERATION Z AXIS

TRC , 841001 PLOT DATE 5-OCT-84 09:14:29
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 100/ 316/ -40
RASR62 MIN. MAX VALUES = 0.02 @ -4.88 , 23.85 @ 76.38

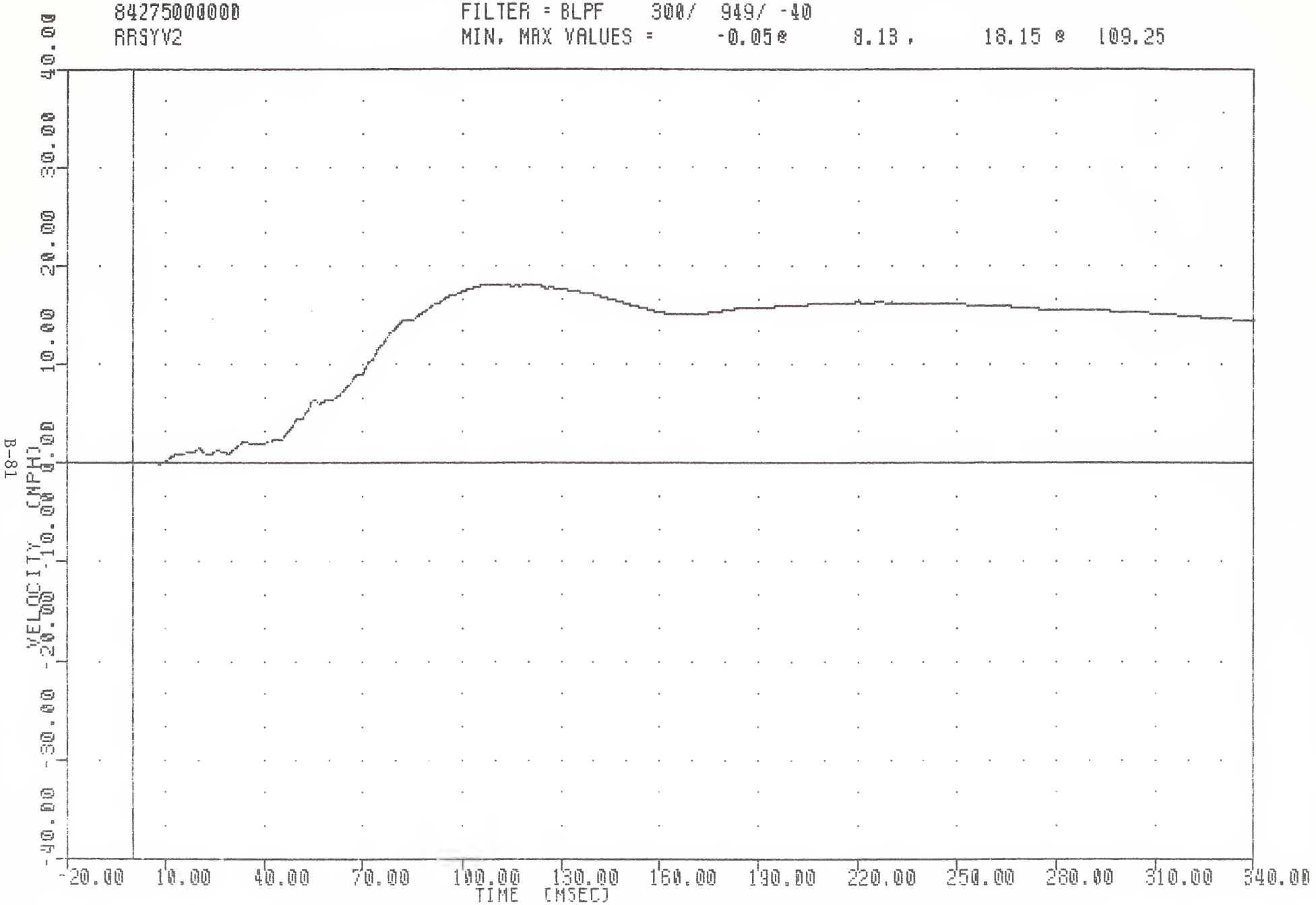


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE RIGHT REAR SILL RESULTANT



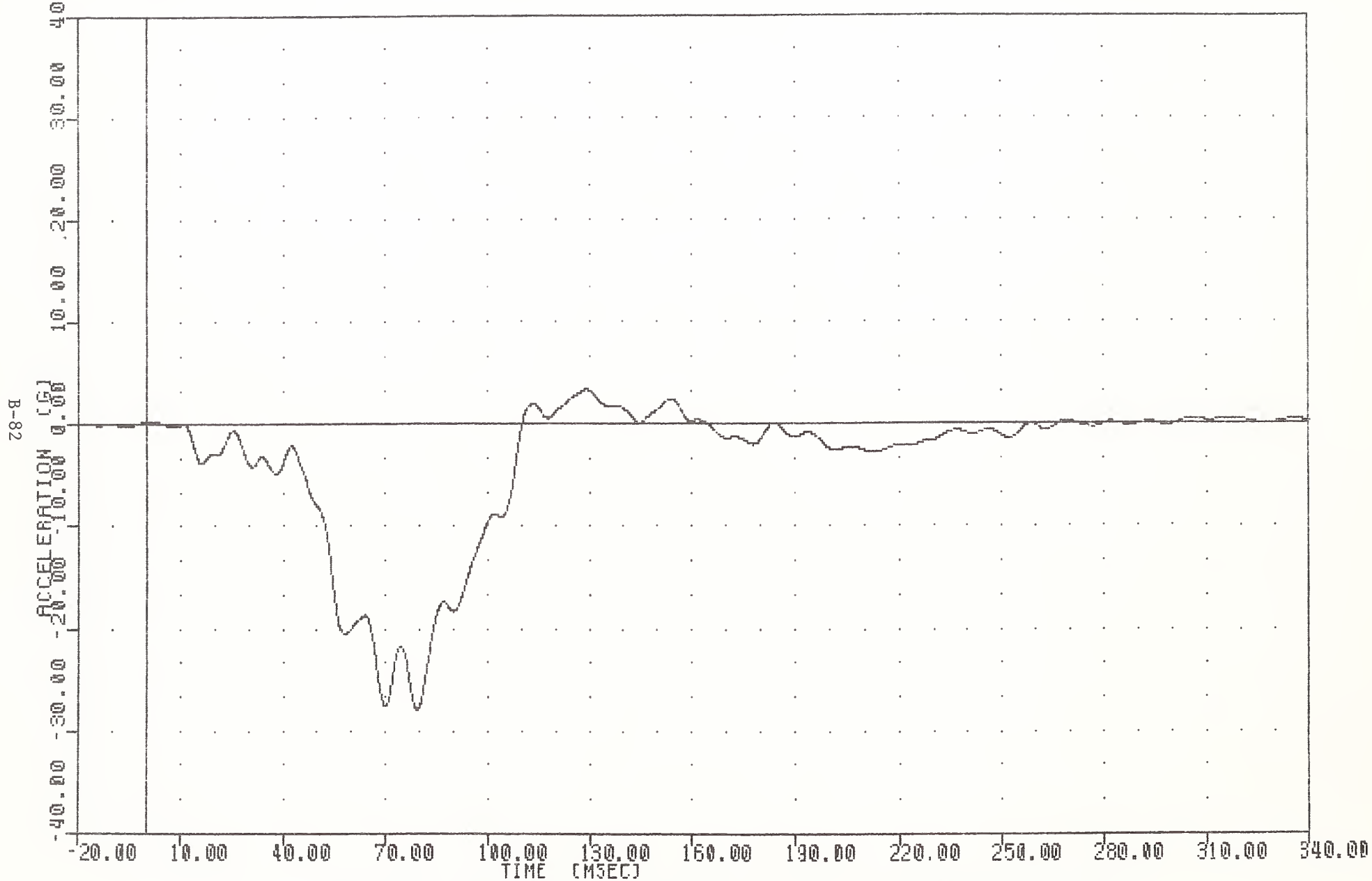
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING ARSXG2

TRC 841001 PLOT DATE 3-OCT-84 09:14:49
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 300/ 949/ -40
RRSYV2 MIN, MAX VALUES = -0.05@ 8.13, 18.15 @ 109.25



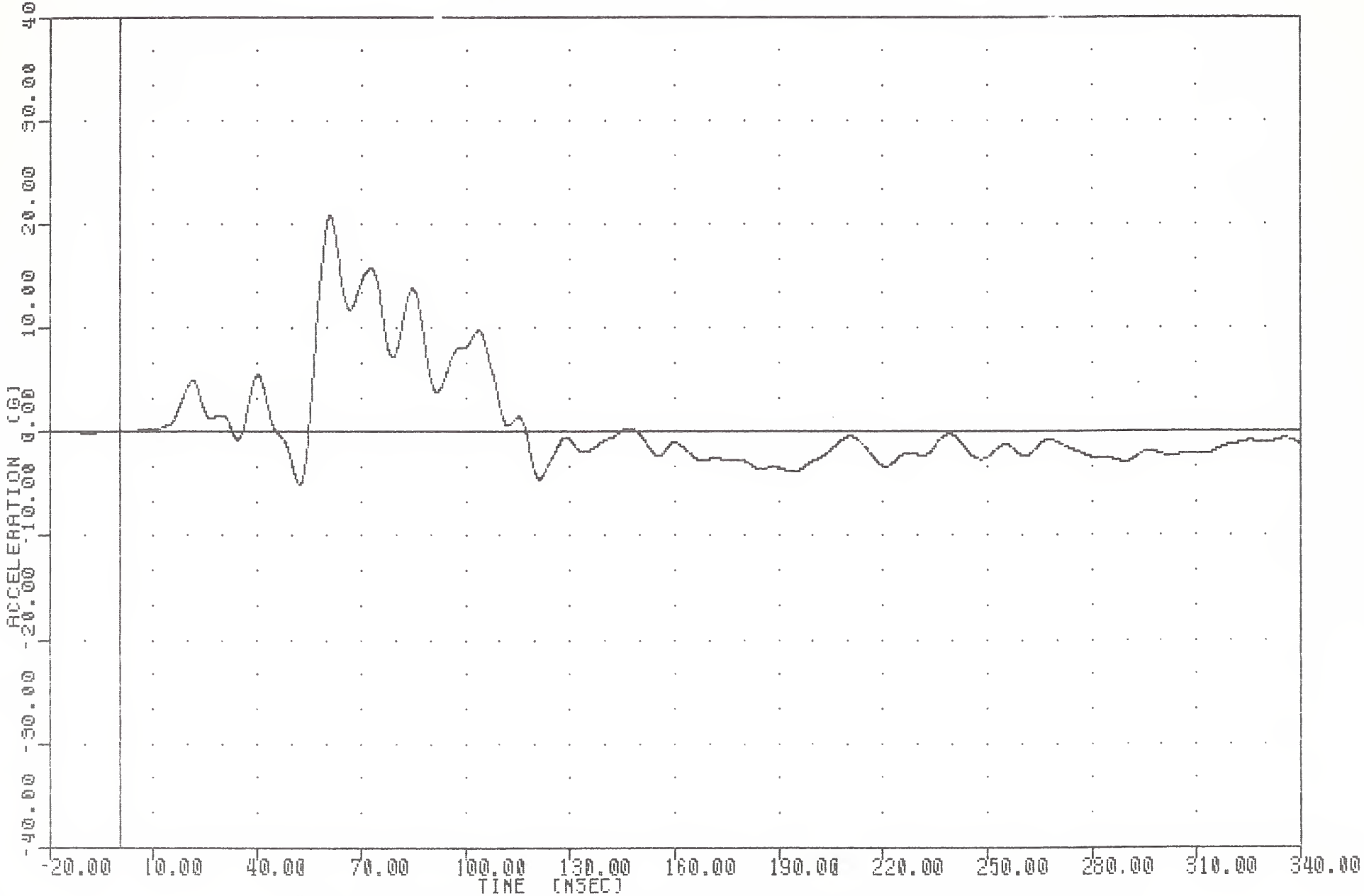
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RRSY62

TRC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
8427500000D FILTER = BLPF 100/ 316/ -40
RDKXG3 MIN, MAX VALUES = -27.91@ 79.00 , 3.37 @ 126.88

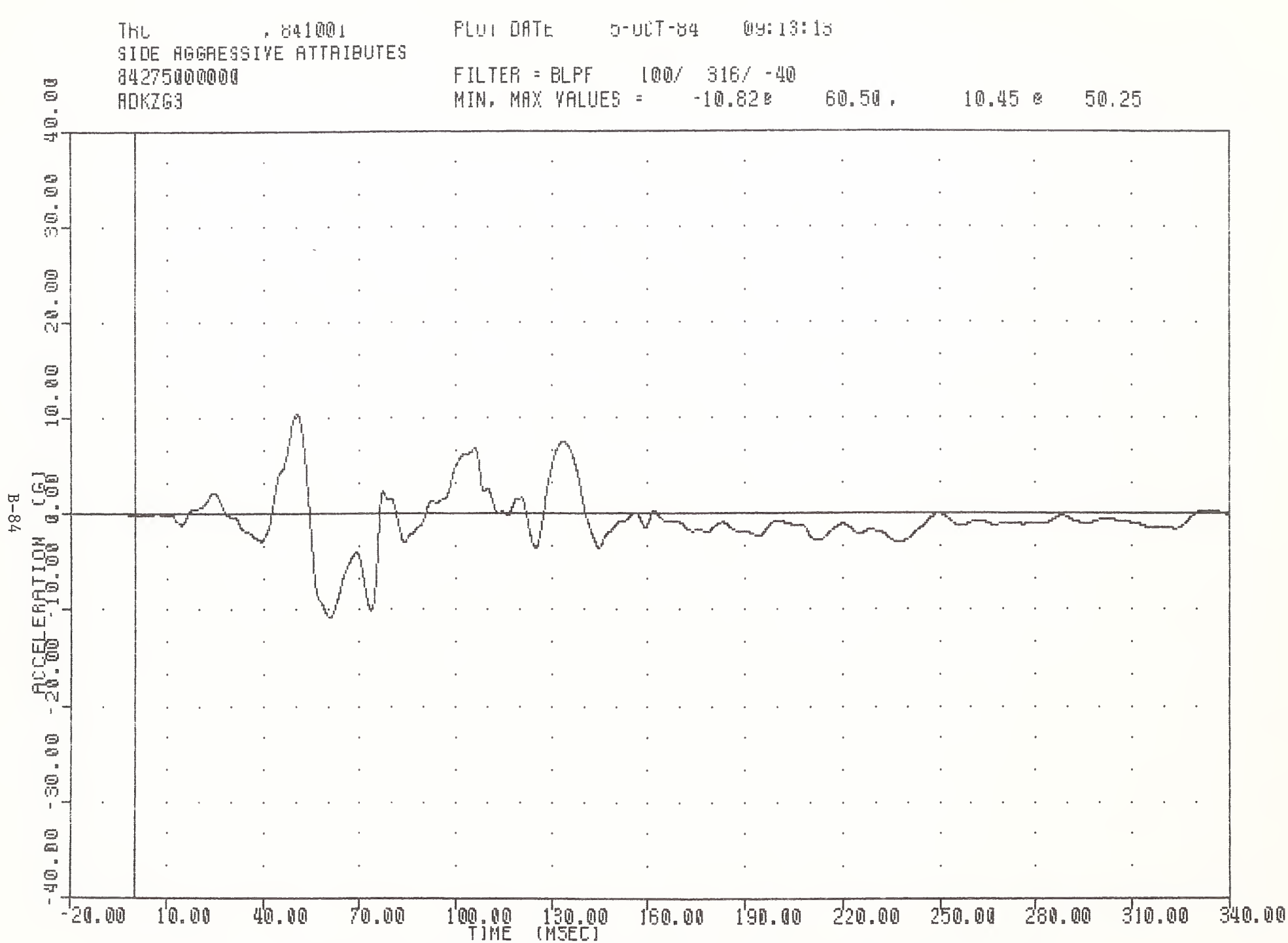


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION X AXIS

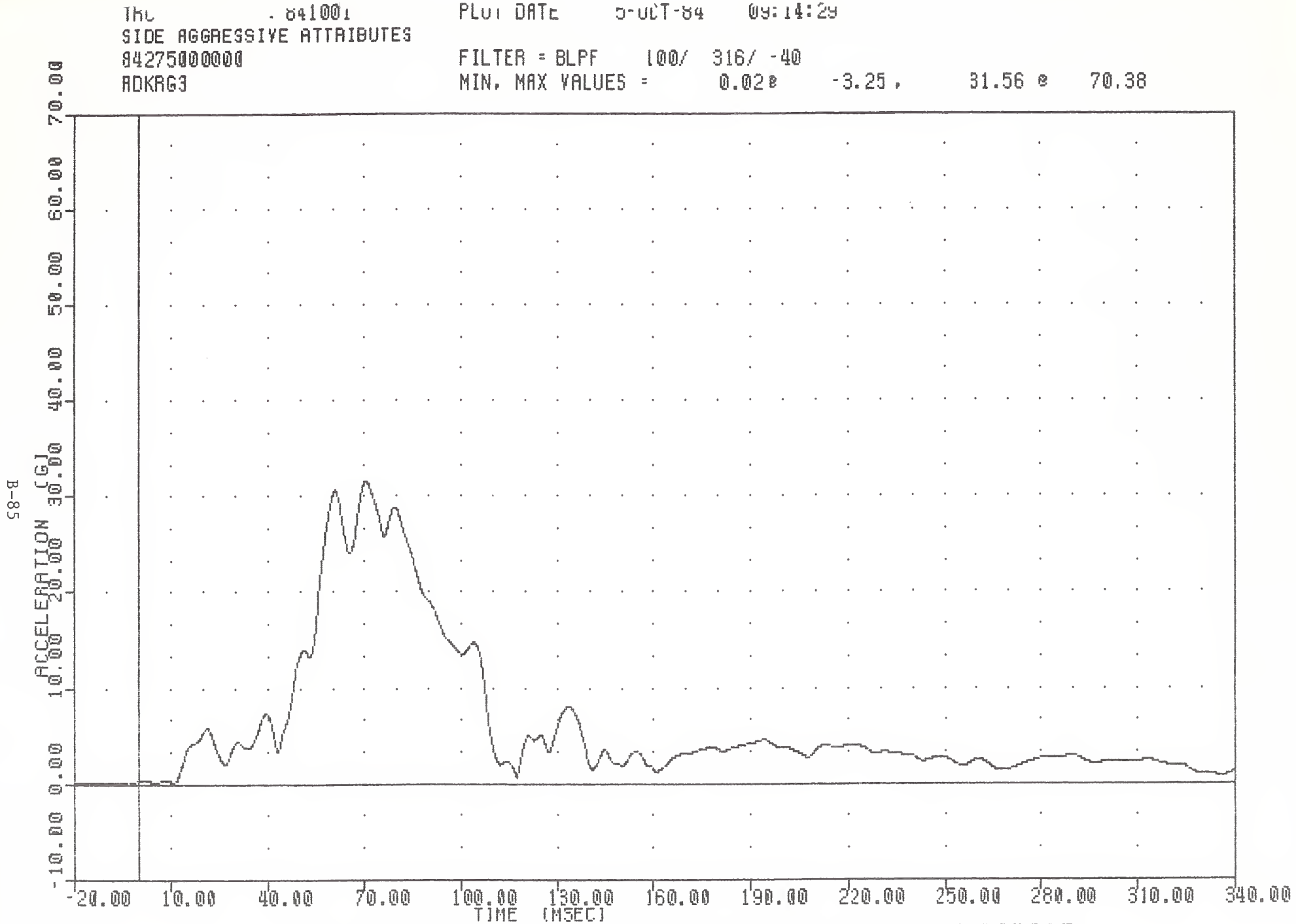
TAC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
842750@0000 FILTER = BLPF 100/ 316/ -40
RDKY63 MIN. MAX VALUES = -5.08 @ 52.13 , 20.81 @ 60.75



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION Y AXIS

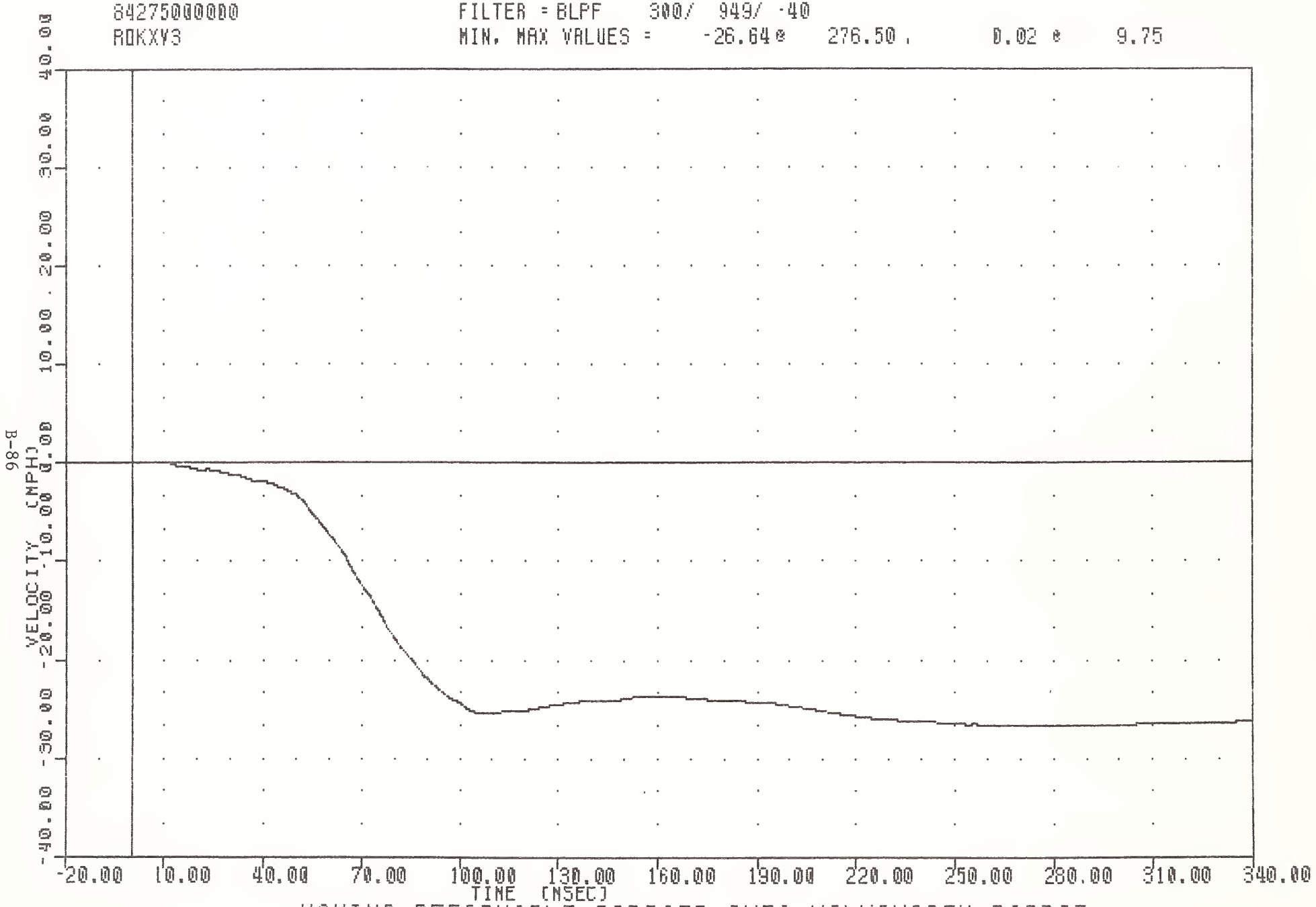


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK ACCELERATION Z AXIS

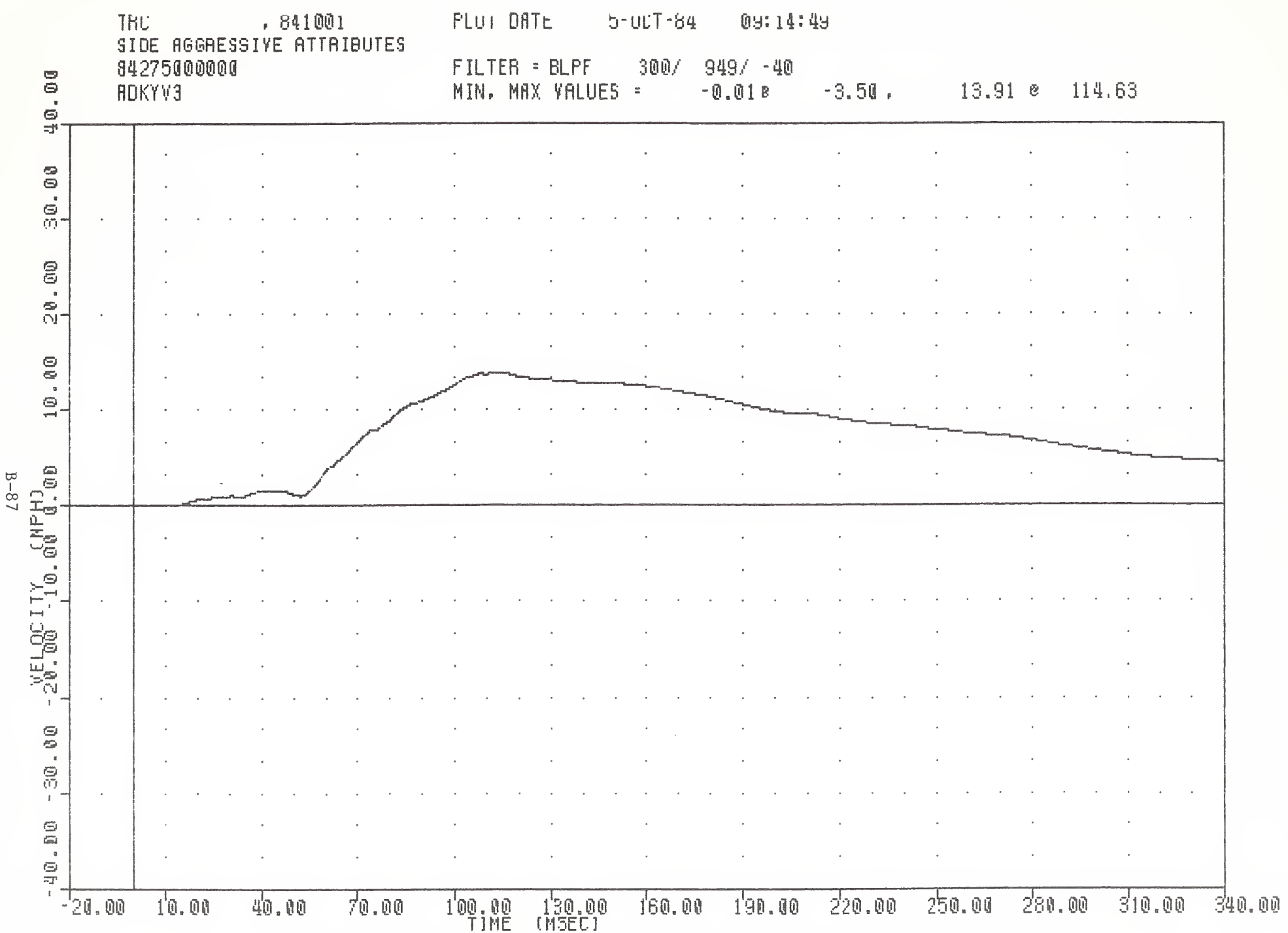


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE REAR DECK RESULTANT

TAL , 84J001 PLOT DATE 5-OCT-84 09:14:49
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 300/ 949/ -40
RDKXV3 MIN, MAX VALUES = -26.64 @ 276.50 , 0.02 @ 9.75

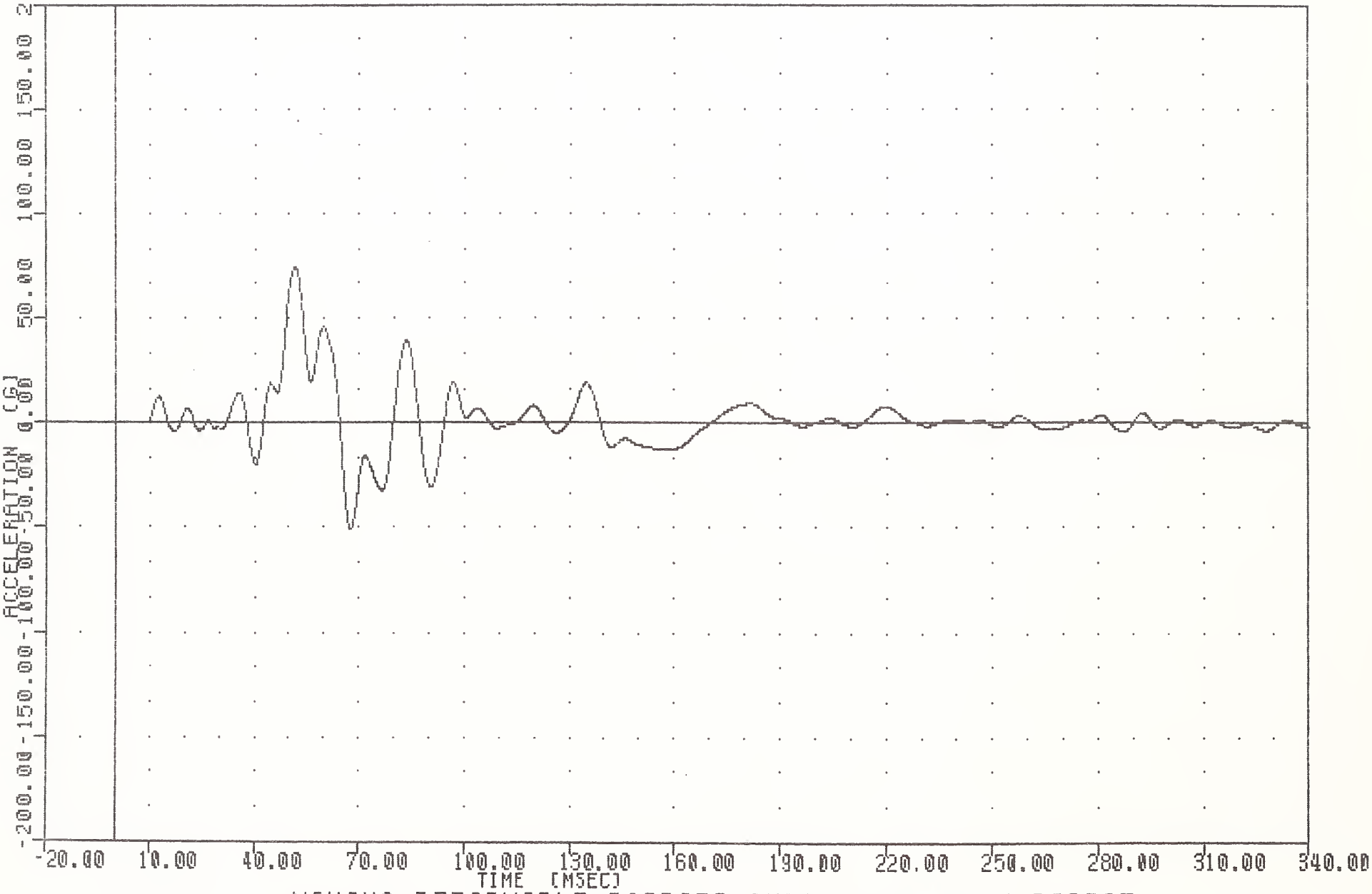


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RDKXG3

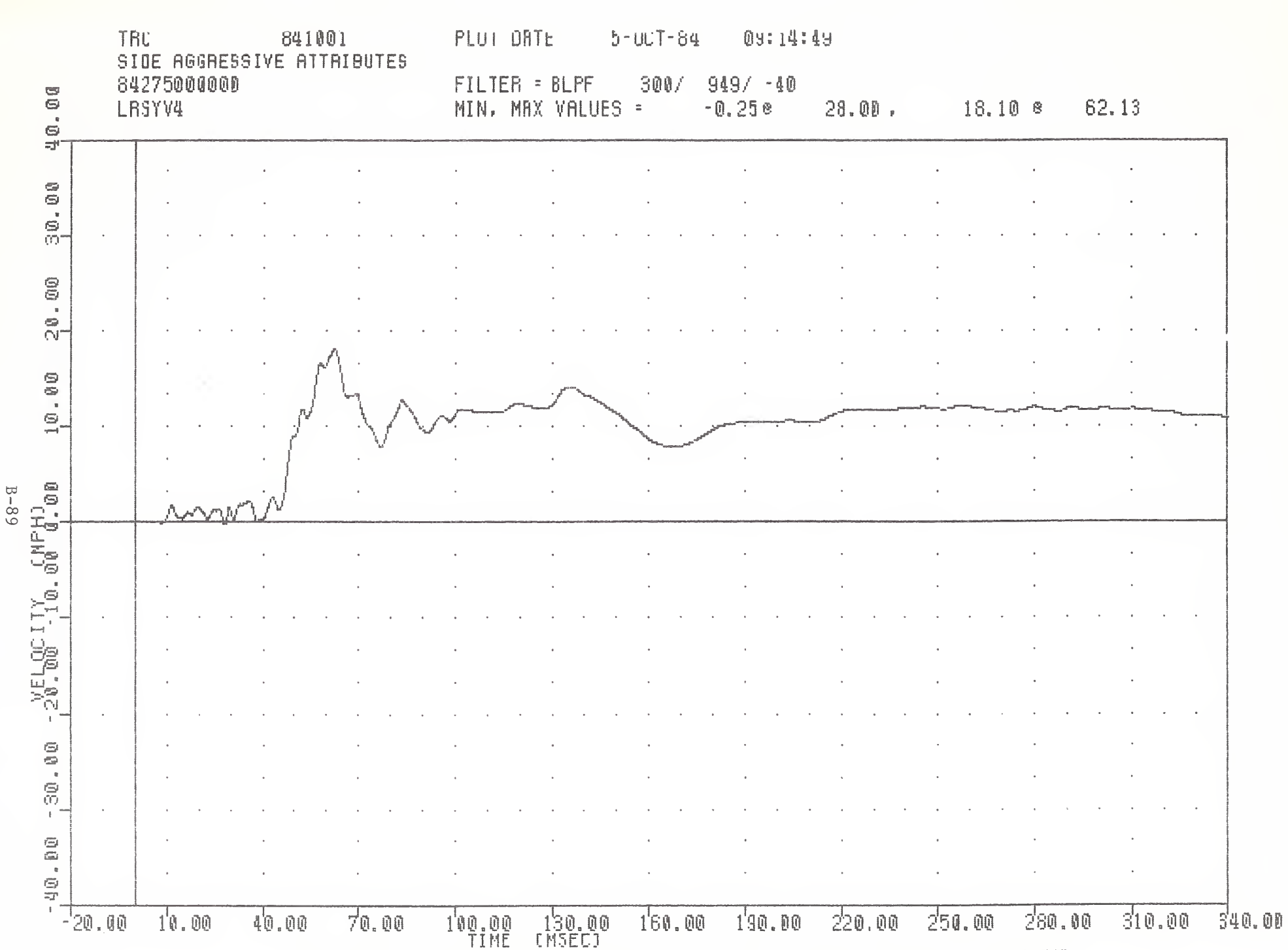


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING RDKYG3

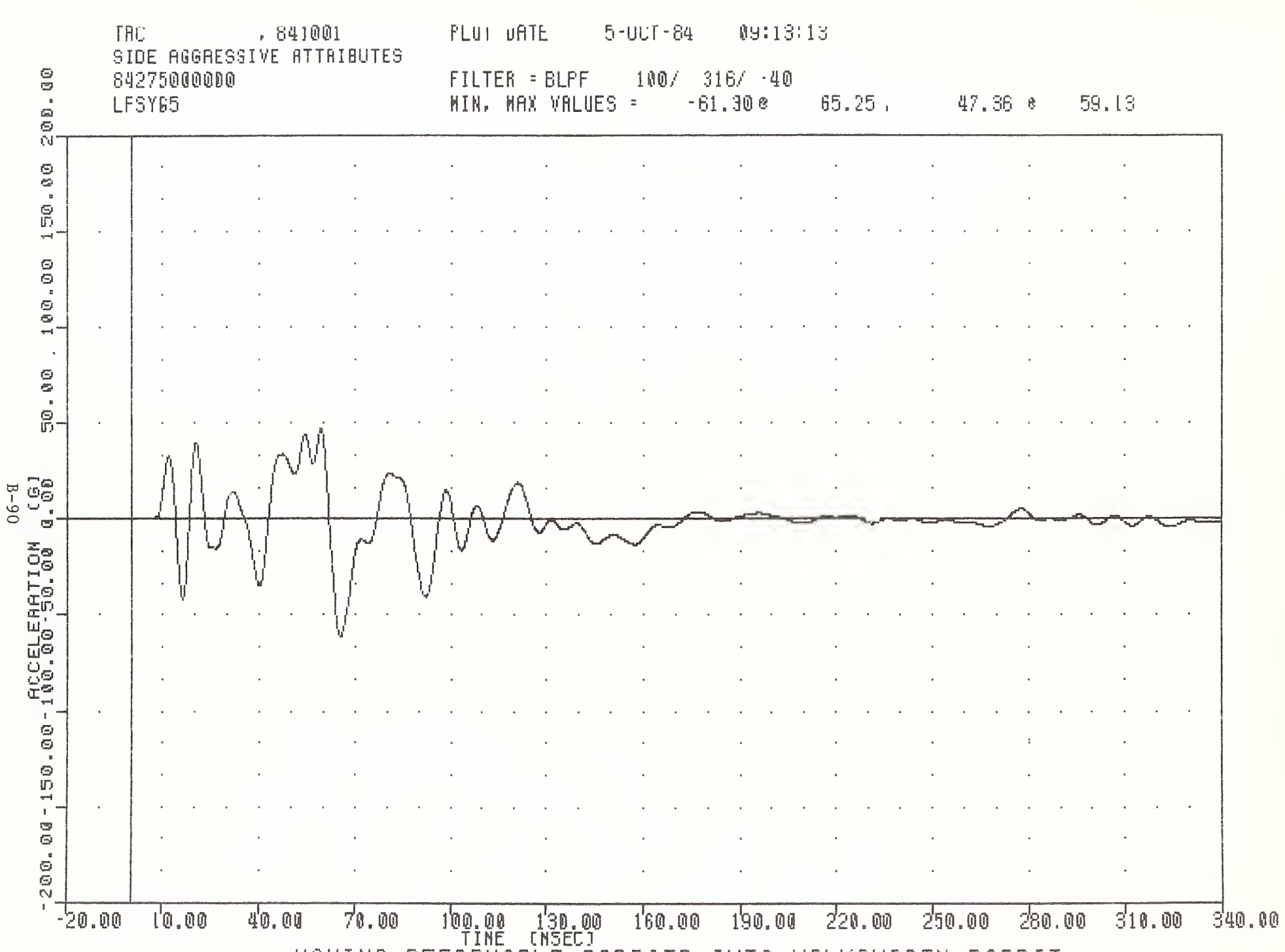
TRL , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 100/ 316/ -40
LRSYG4 MIN, MAX VALUES = -51.15@ 67.50 , 74.89 @ 51.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT REAR SILL ACCELERATION Y AXIS

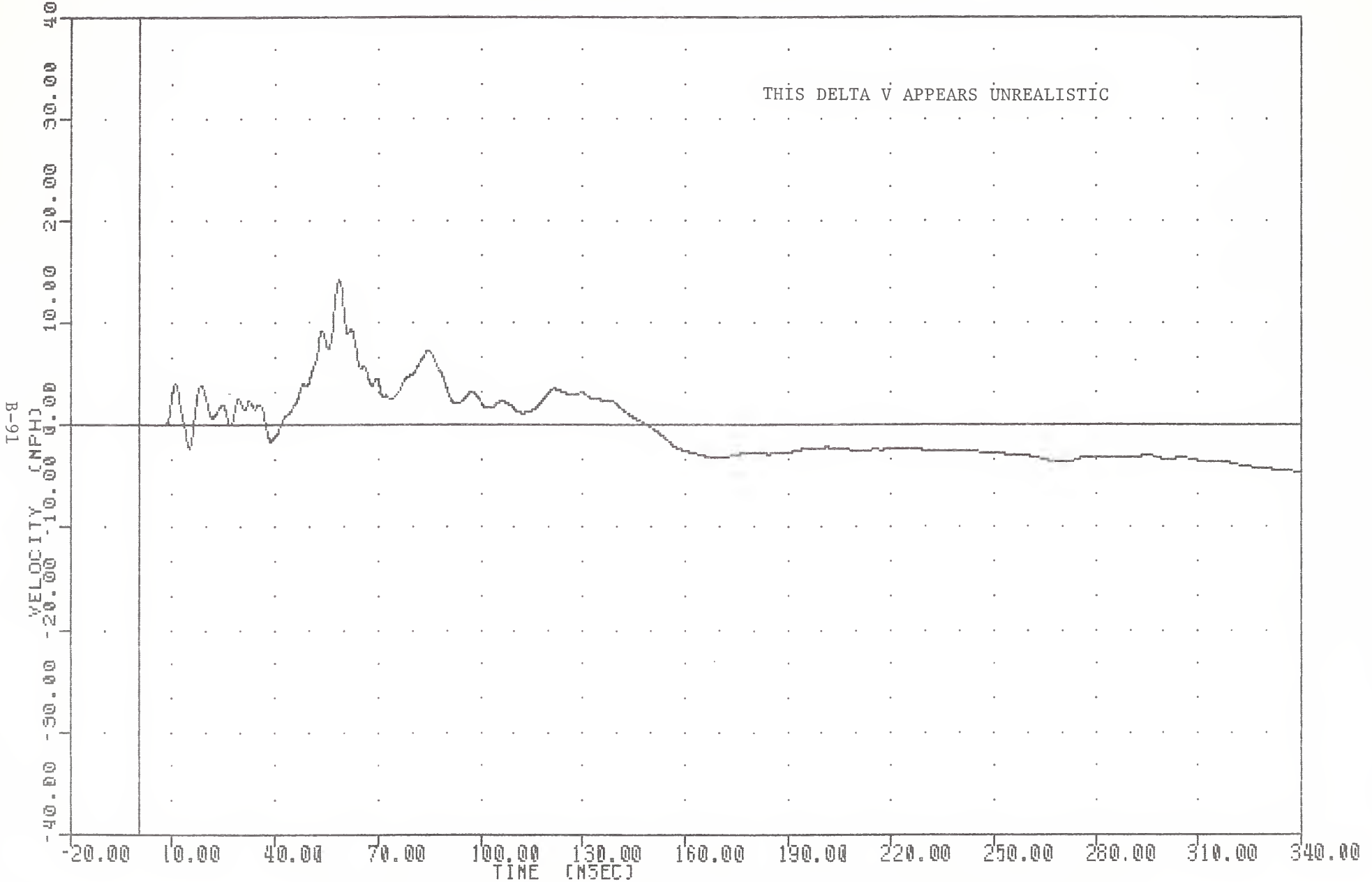


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LRSYG4



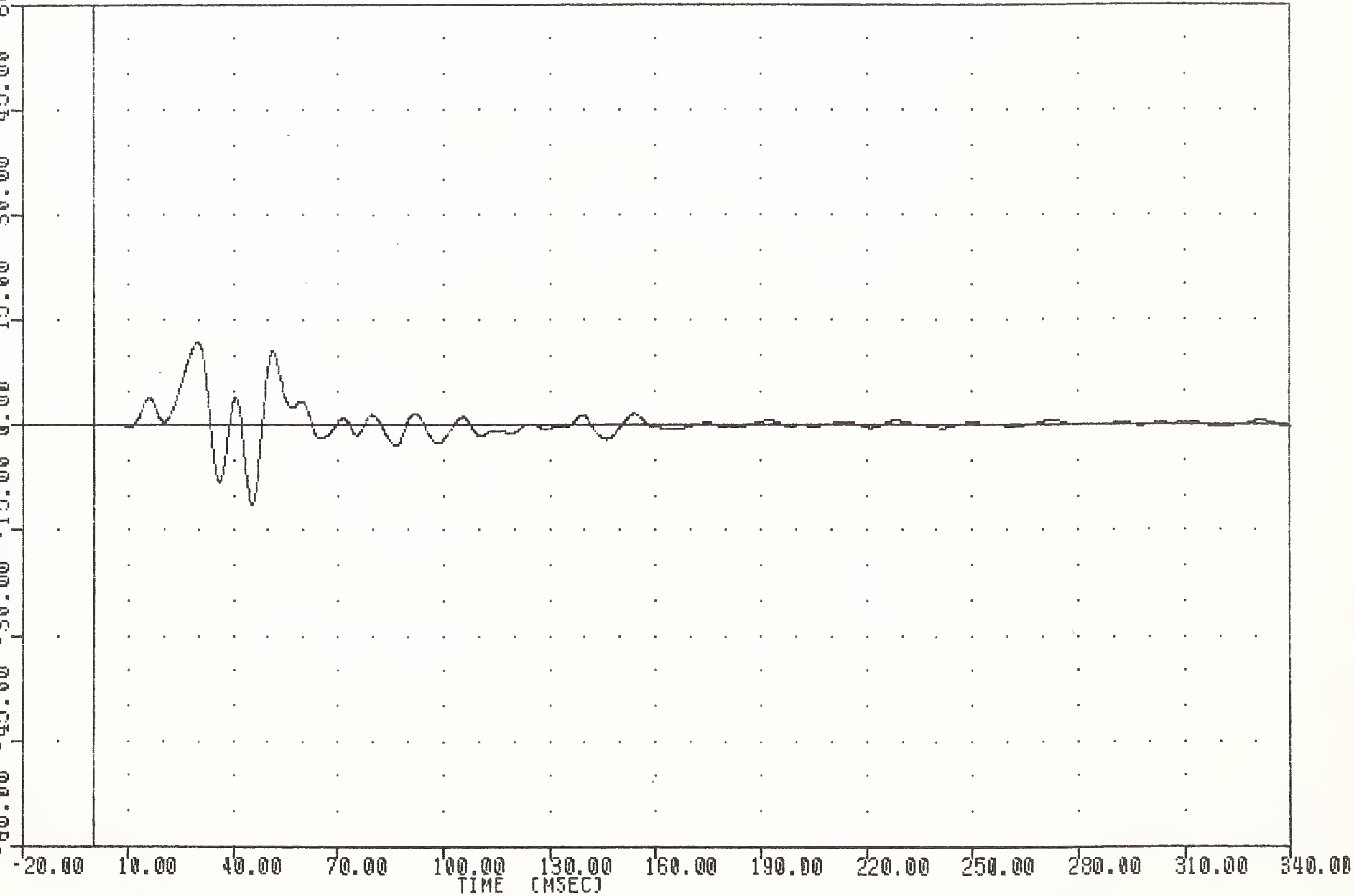
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT SILL ACCELERATION Y AXIS

TAC , 841001 PLOT DATE 5-OCT-84 09:14:49
SIDE AGGRESSIVE ATTAIBUTES
84275000000 FILTER = BLPF 300/ 949/ -40
LFSYV5 MIN, MAX VALUES = -4.64 @ 340.00 , 14.20 @ 58.38

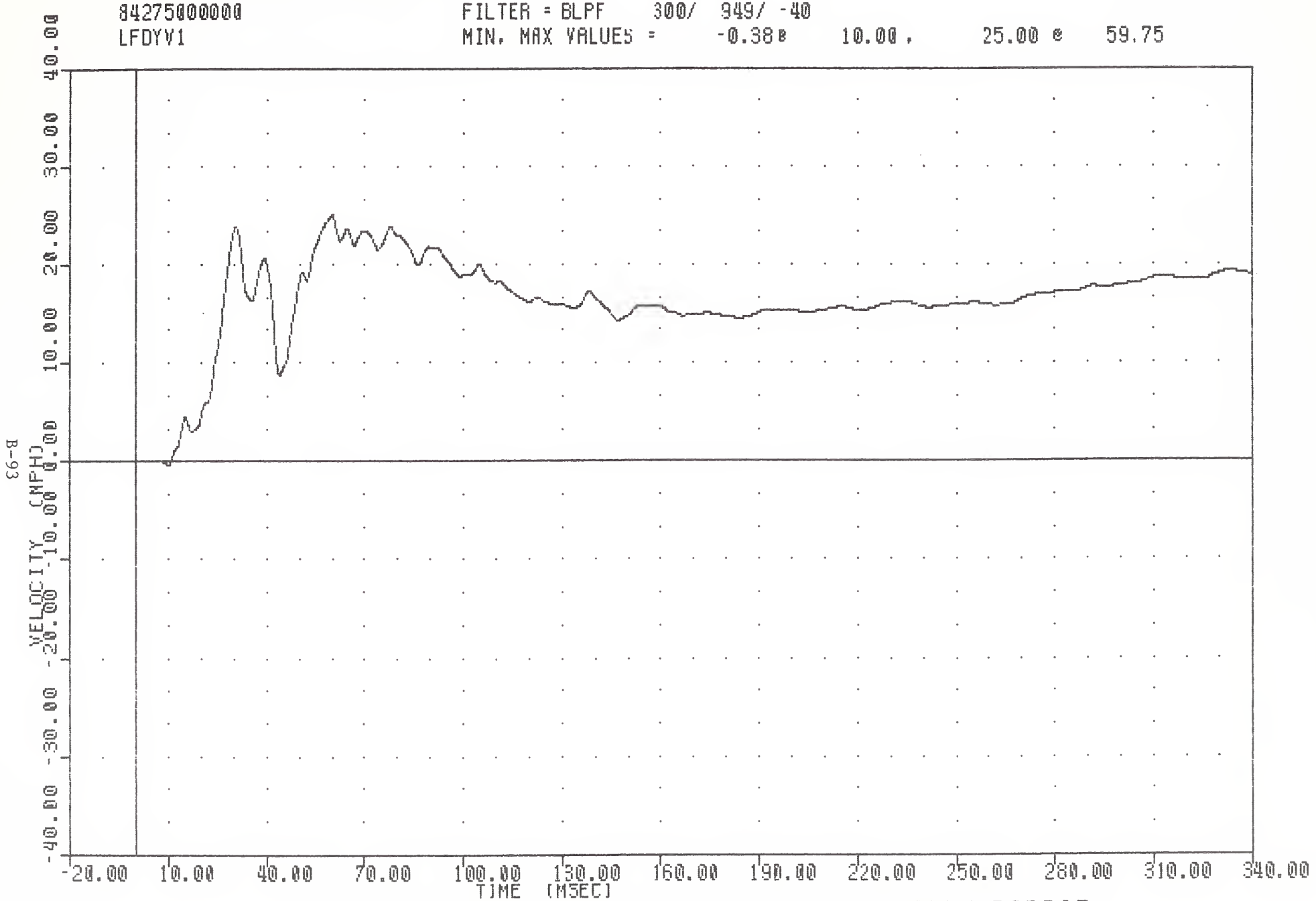


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFSYG5

TRC 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 100/ 316/ -40
LFDYG1 MIN, MAX VALUES = -112.54@ 45.25 , 118.98 @ 29.63

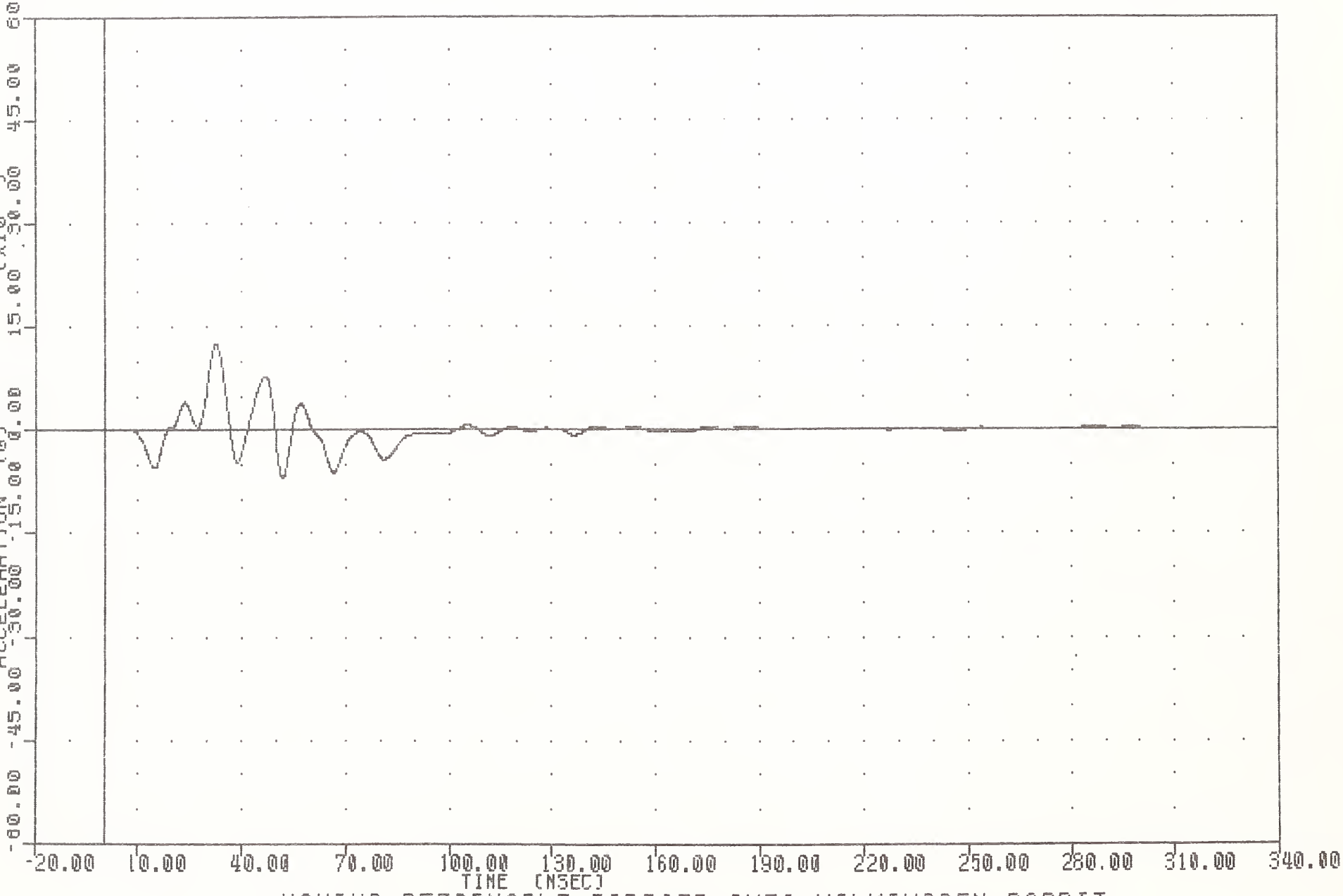


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 6) ACCELERATION Y AXIS

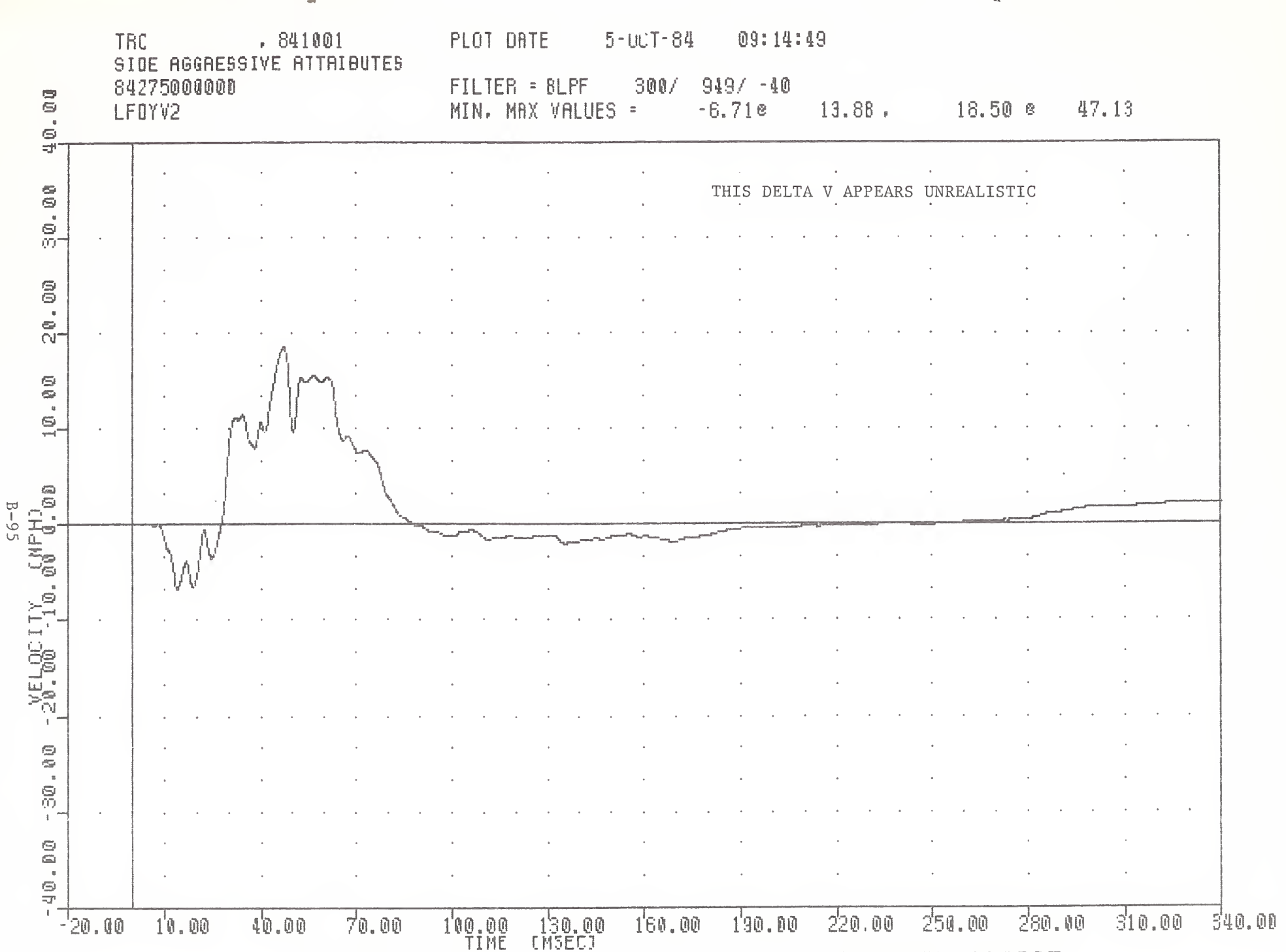


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG1

TAC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
842750@0000 FILTER = BLPF 100/ 316/ -40
LFDY62 MIN, MAX VALUES = -69.91 @ 51.75 , 125.57 @ 32.38

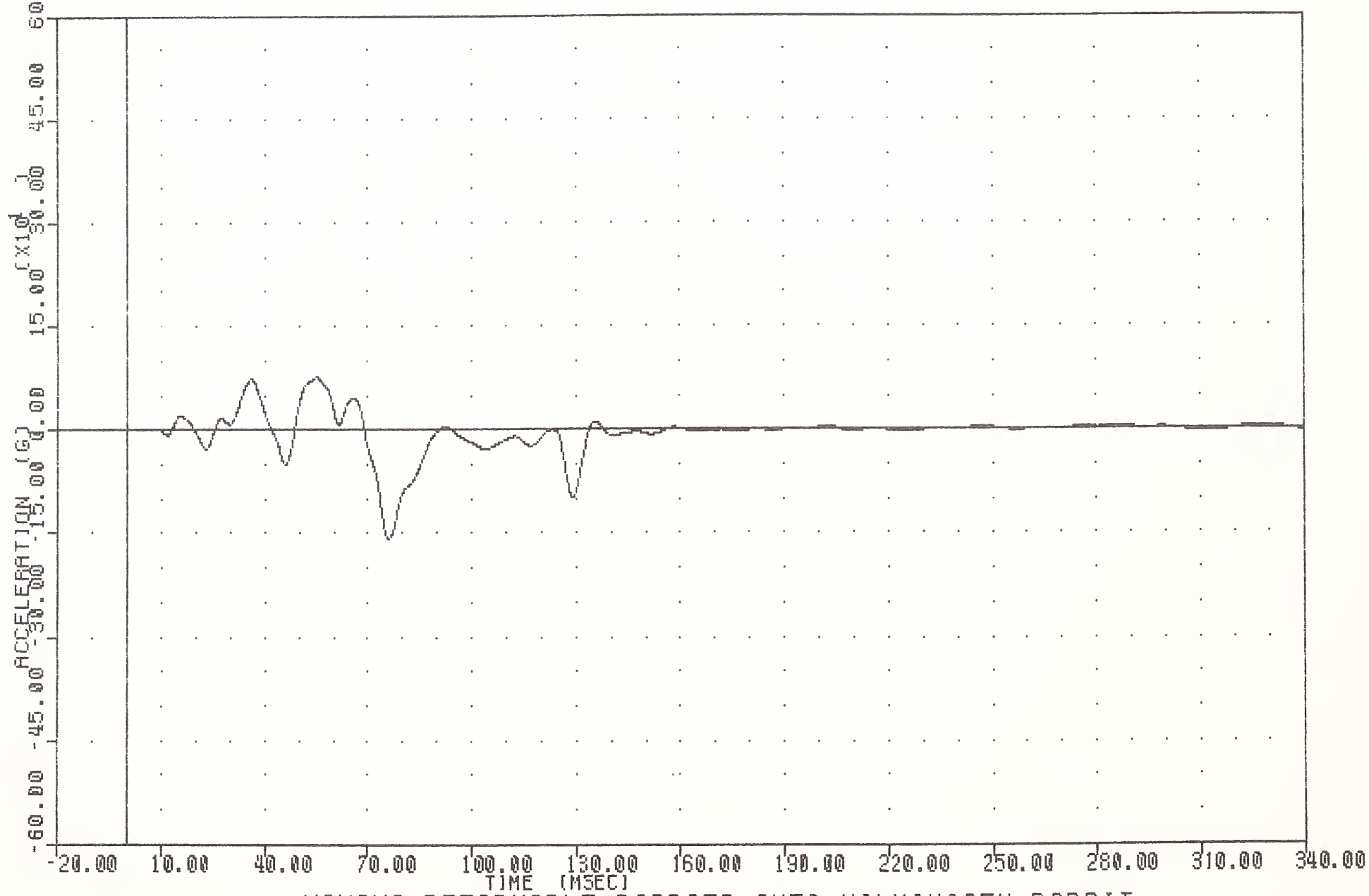


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 8) ACCELERATION Y AXIS



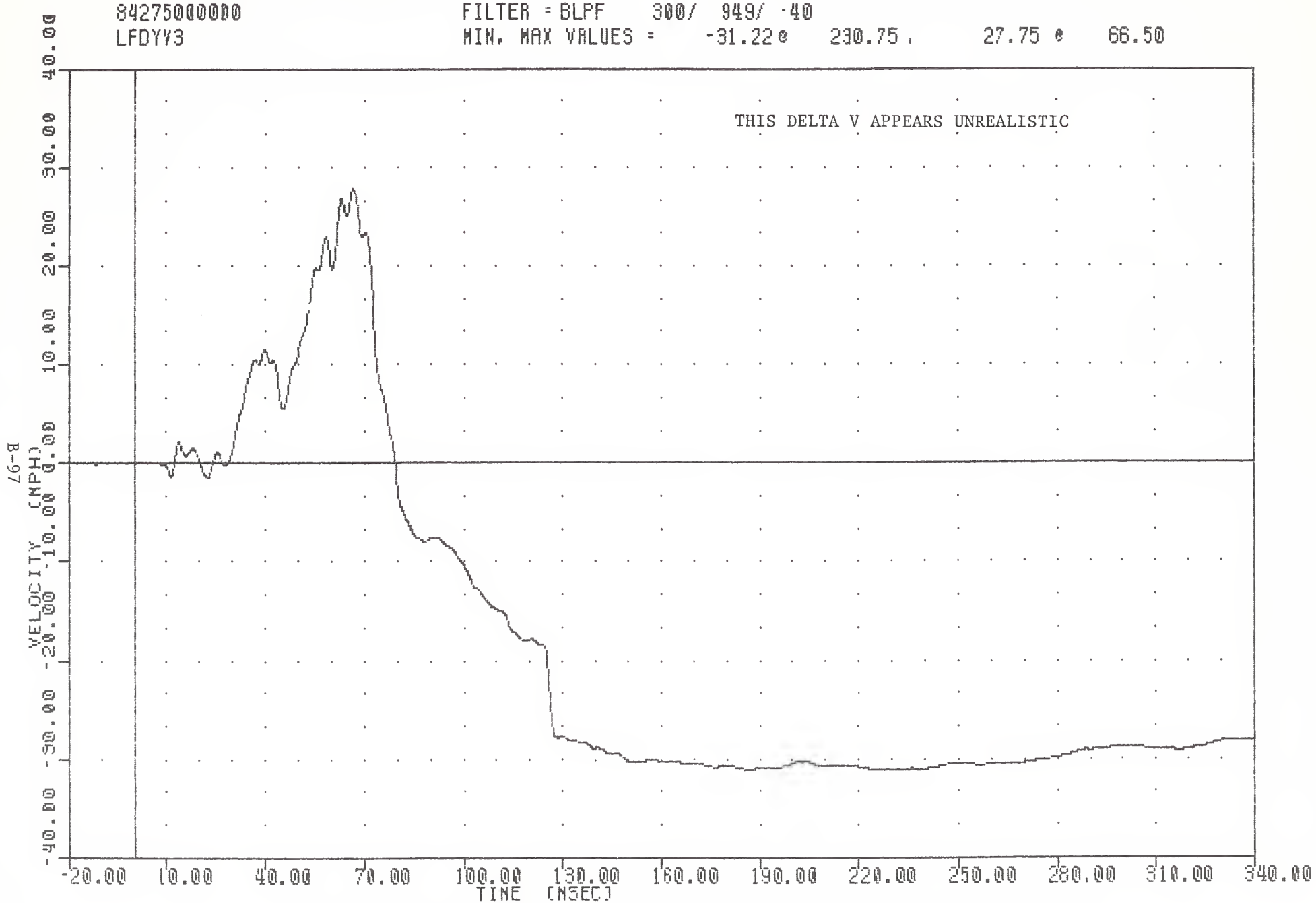
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG2

TRC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = BLPF (00/ 316/ -40
LFDYG3 MIN, MAX VALUES = -157.89 @ 75.88 , 75.99 @ 54.88

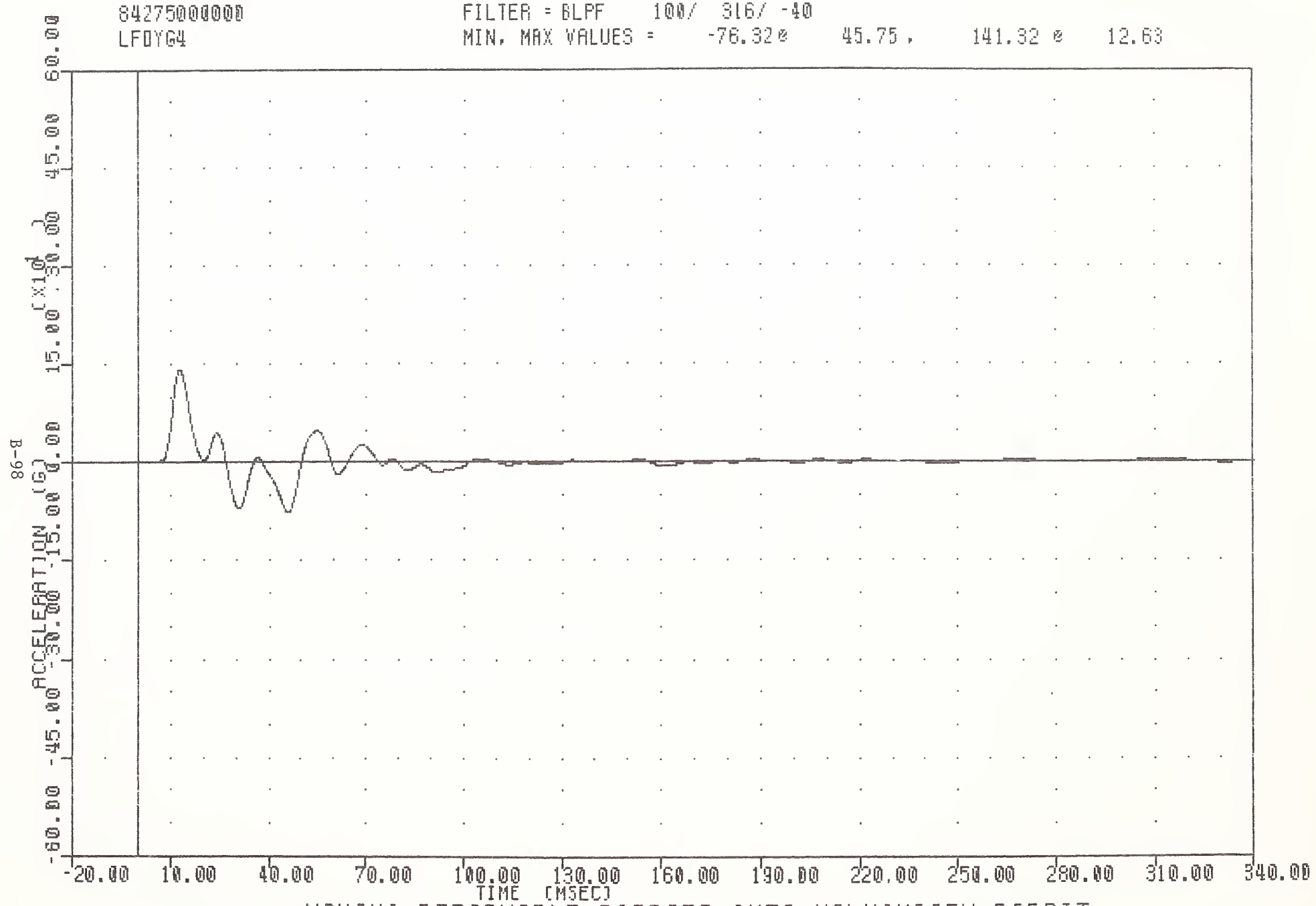


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 9) ACCELERATION Y AXIS

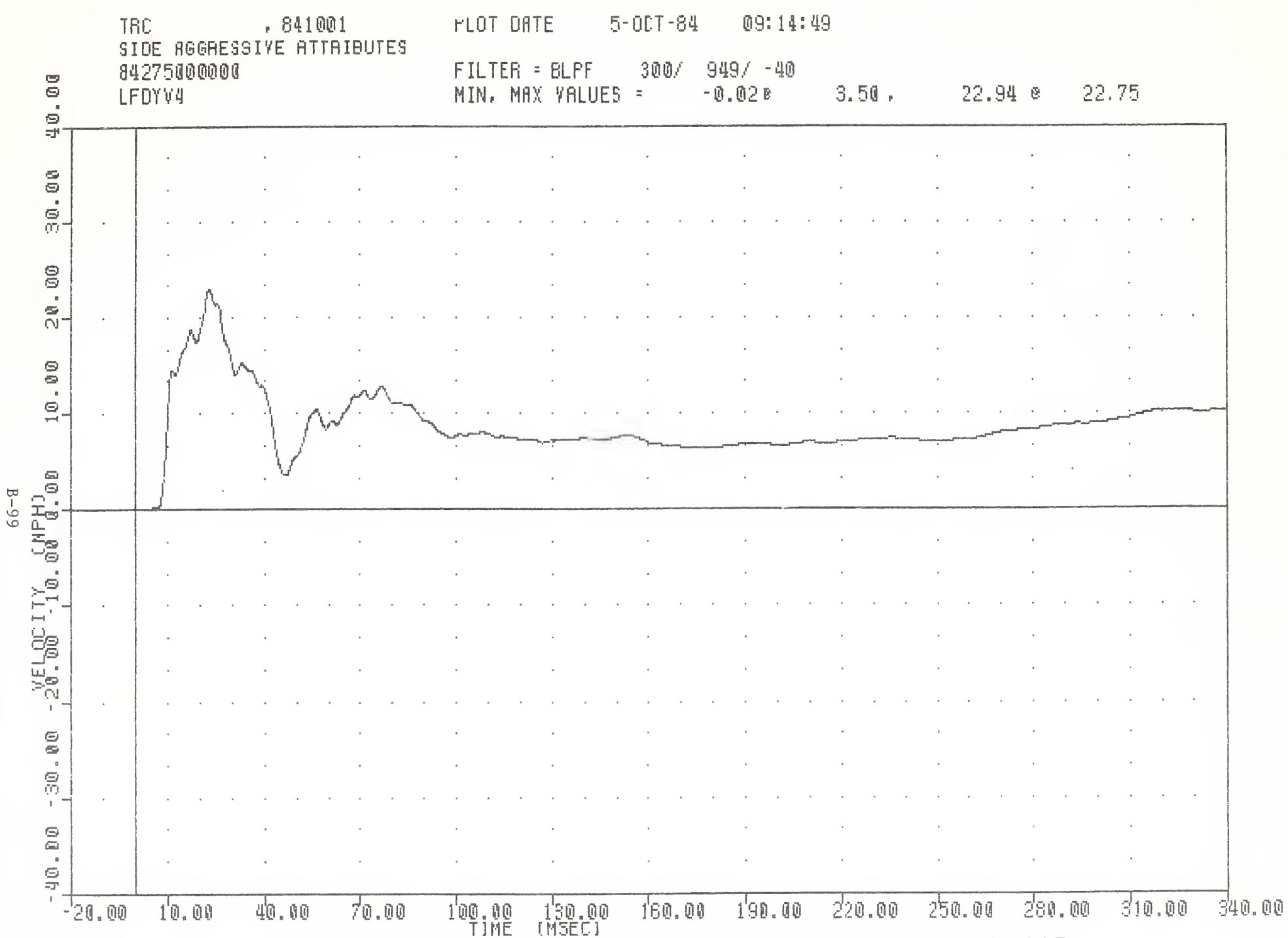
TRC 841001 PLOT DATE 5-OCT-84 09:14:49
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = BLPF 300/ 949/ -40
LFDYY3 MIN, MAX VALUES = -31.22 @ 230.75 , 27.75 @ 66.50



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG3

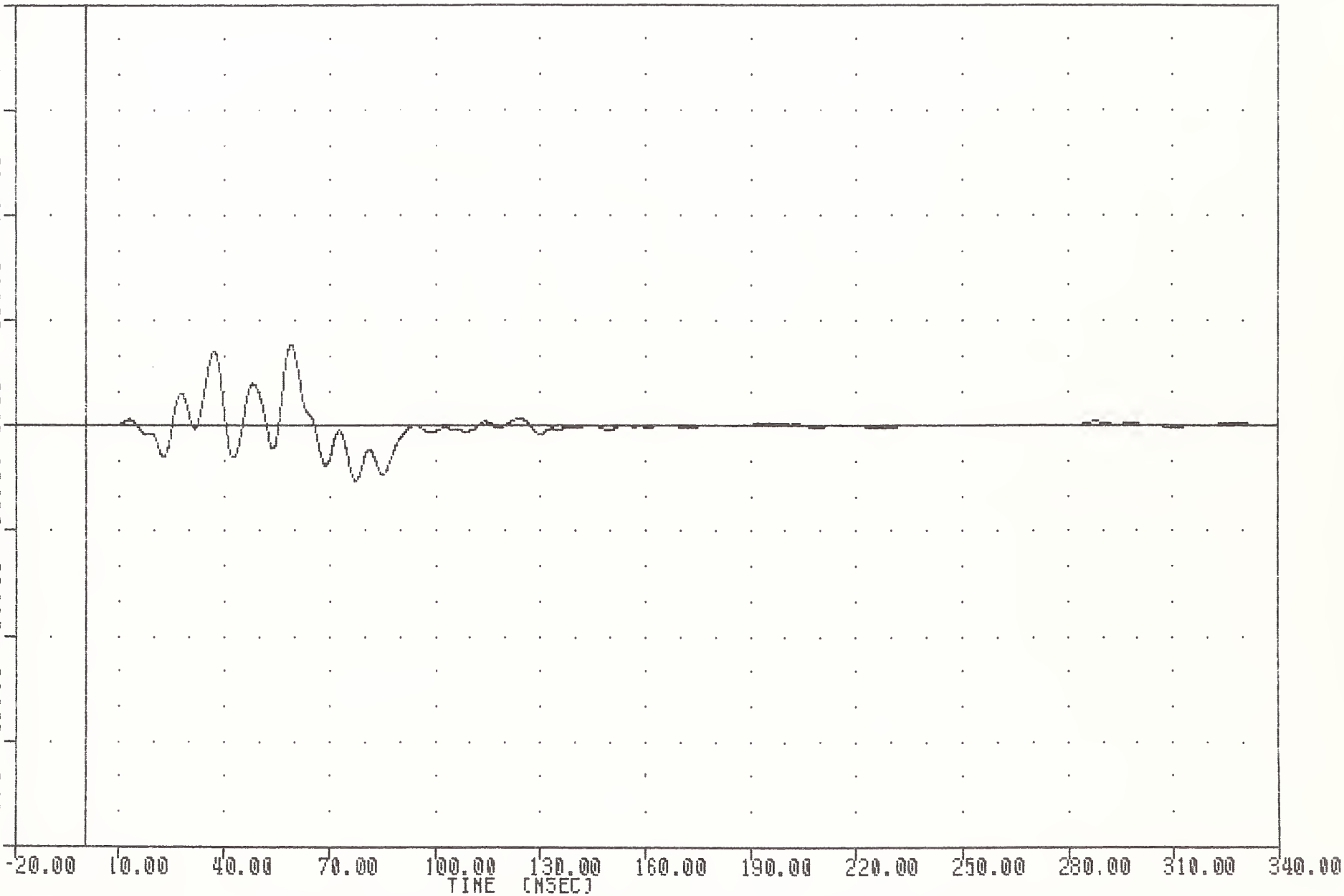


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 10) ACCELERATION Y AXIS

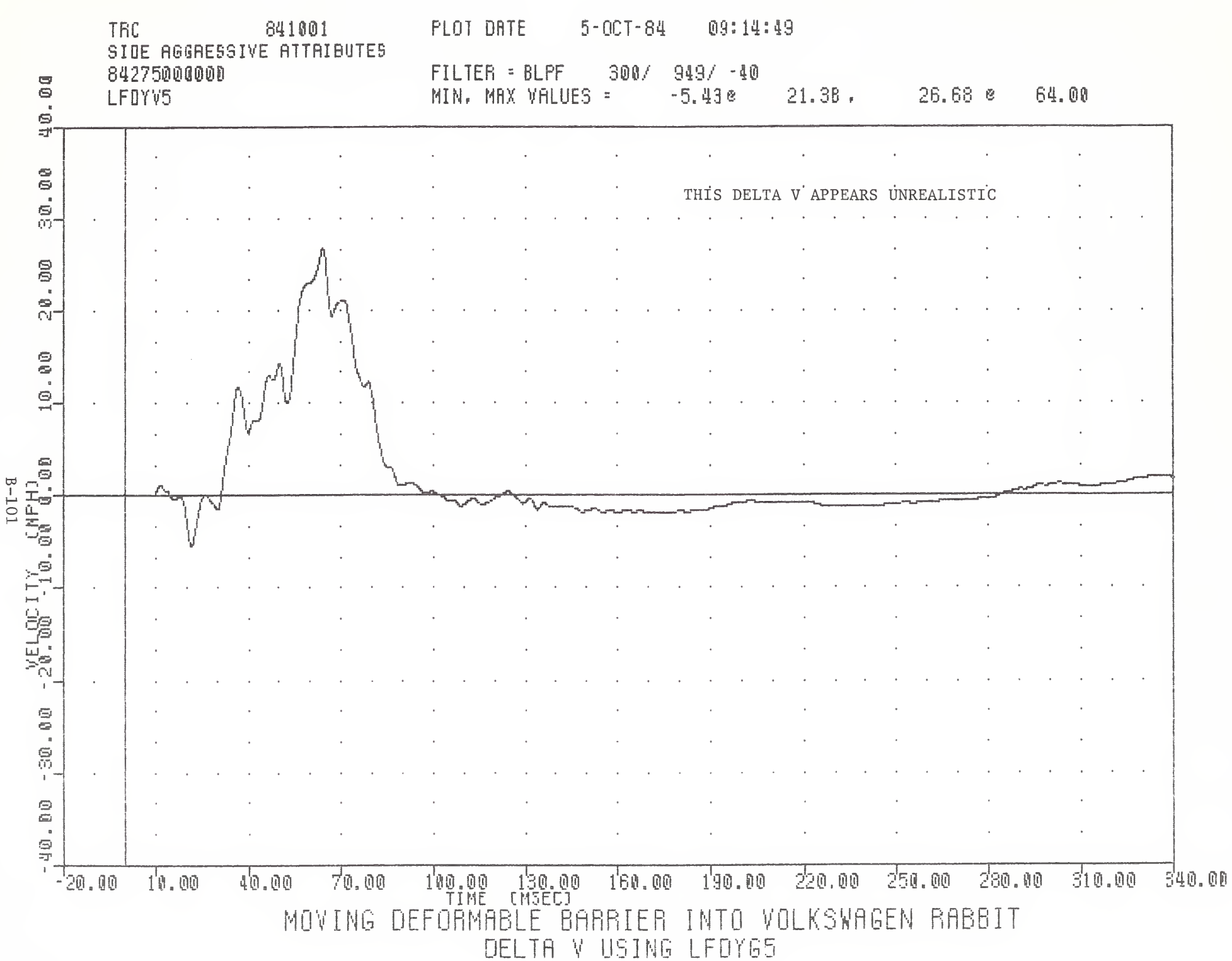


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDYG4

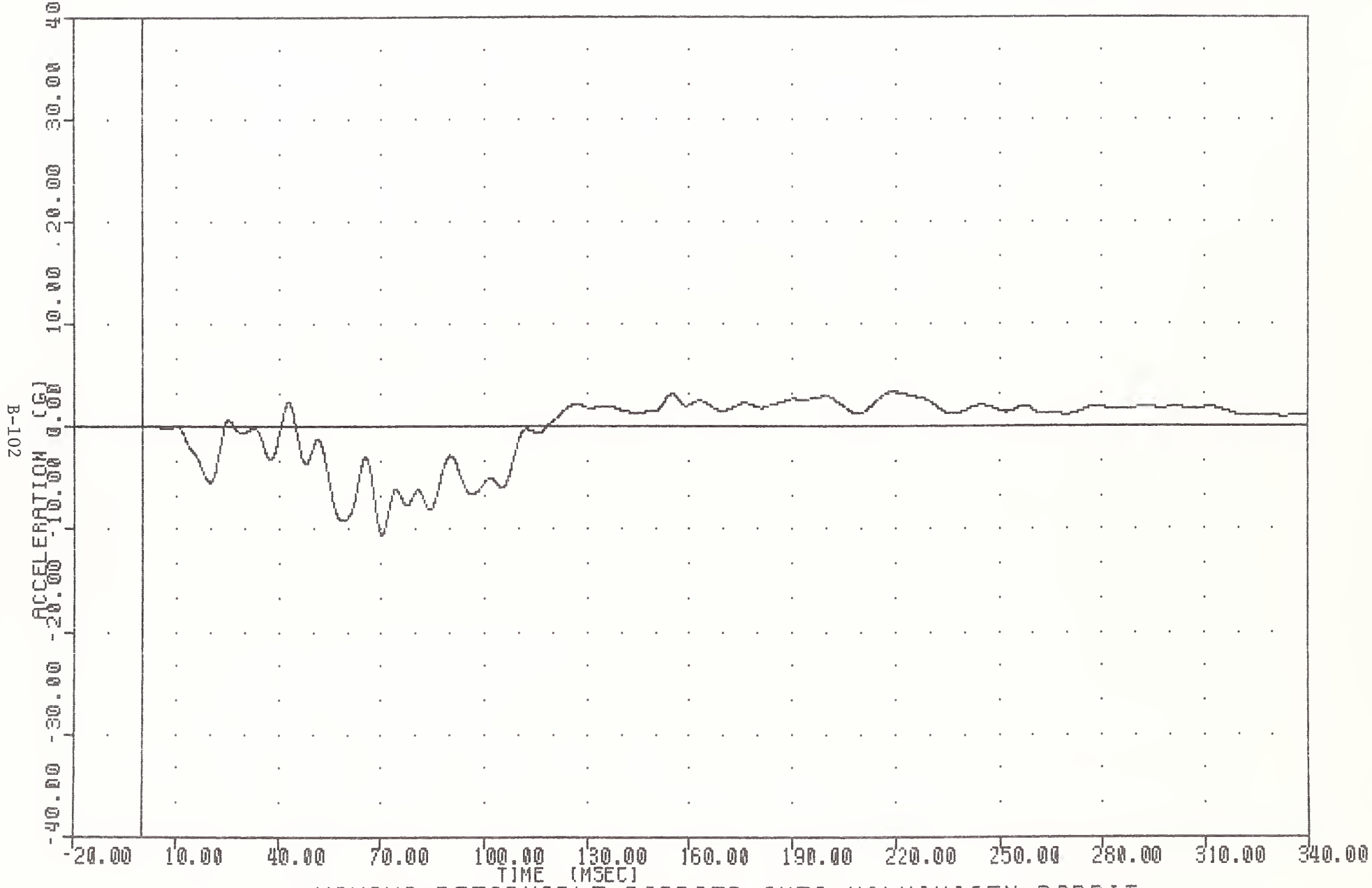
TAC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 100/ 316/ -40
LFDY65 MIN, MAX VALUES = -78.74 @ 77.25 , 116.30 @ 58.75



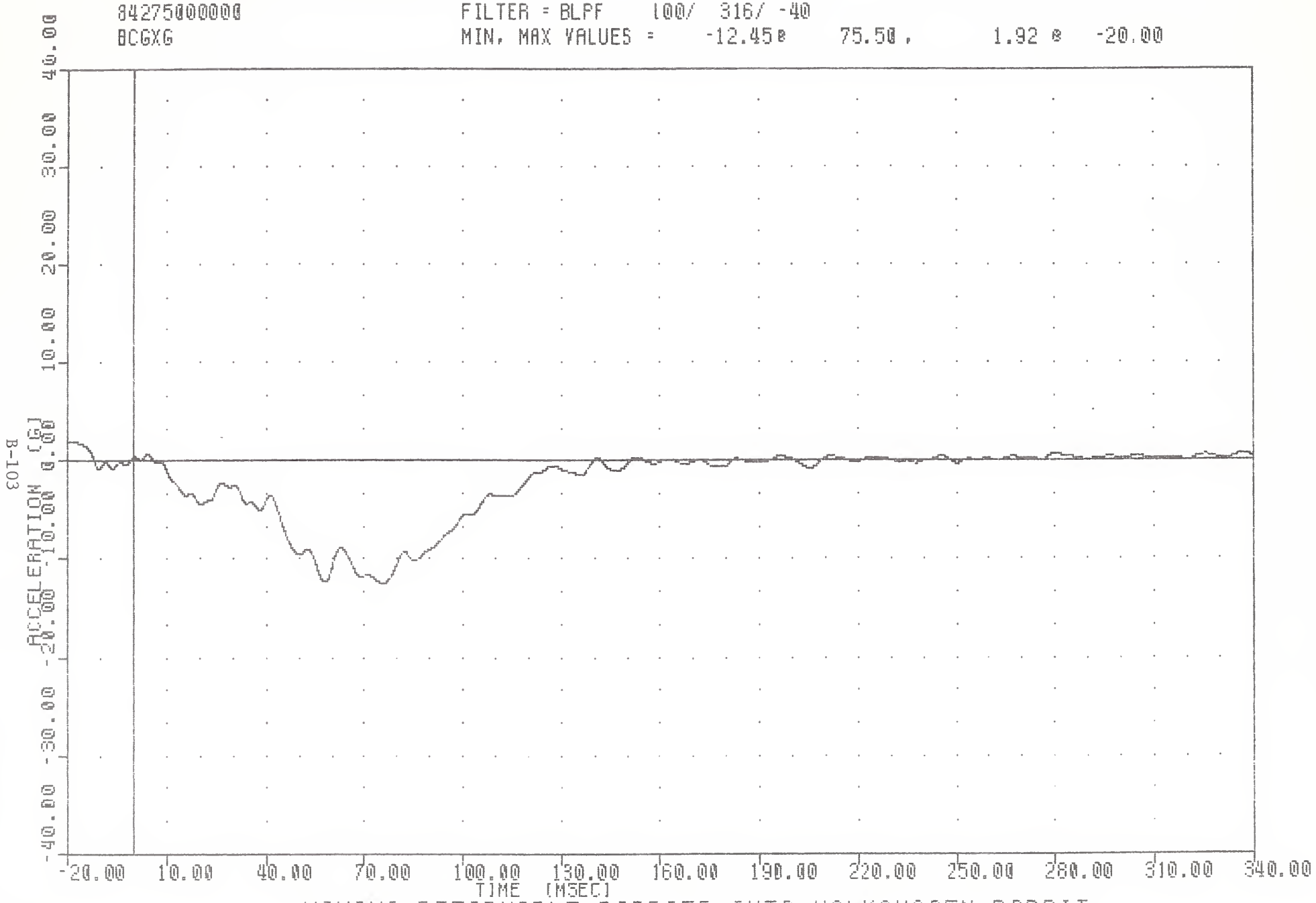
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE LEFT FRONT DOOR (POSITION 11) ACCELERATION Y AXIS


TRC 841001 PLOT DATE 5-OCT-84 09:14:49
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 300/ 949/ -40
LFDYV5 MIN, MAX VALUES = -5.43@ 21.38, 26.68@ 64.00
THIS DELTA V APPEARS UNREALISTIC
VELOCITY (MPH)
40.00
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING LFDY65

TRC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 100/ 316/ -40
TFRXG7 MIN, MAX VALUES = -10.51 @ 70.00 , 3.39 @ 219.00

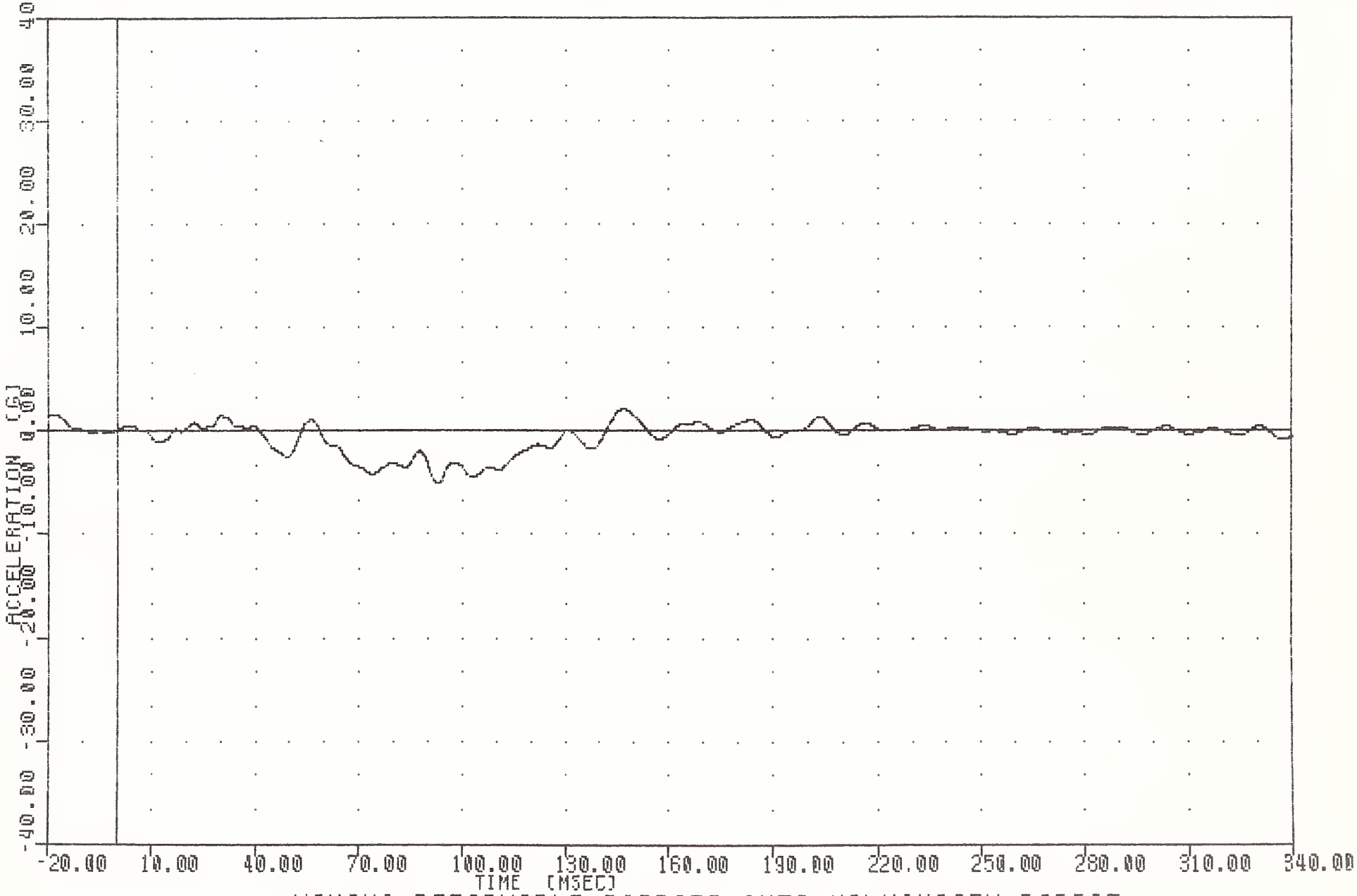


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
VEHICLE TRUNK FLOOR RIGHT ACCELERATION X AXIS

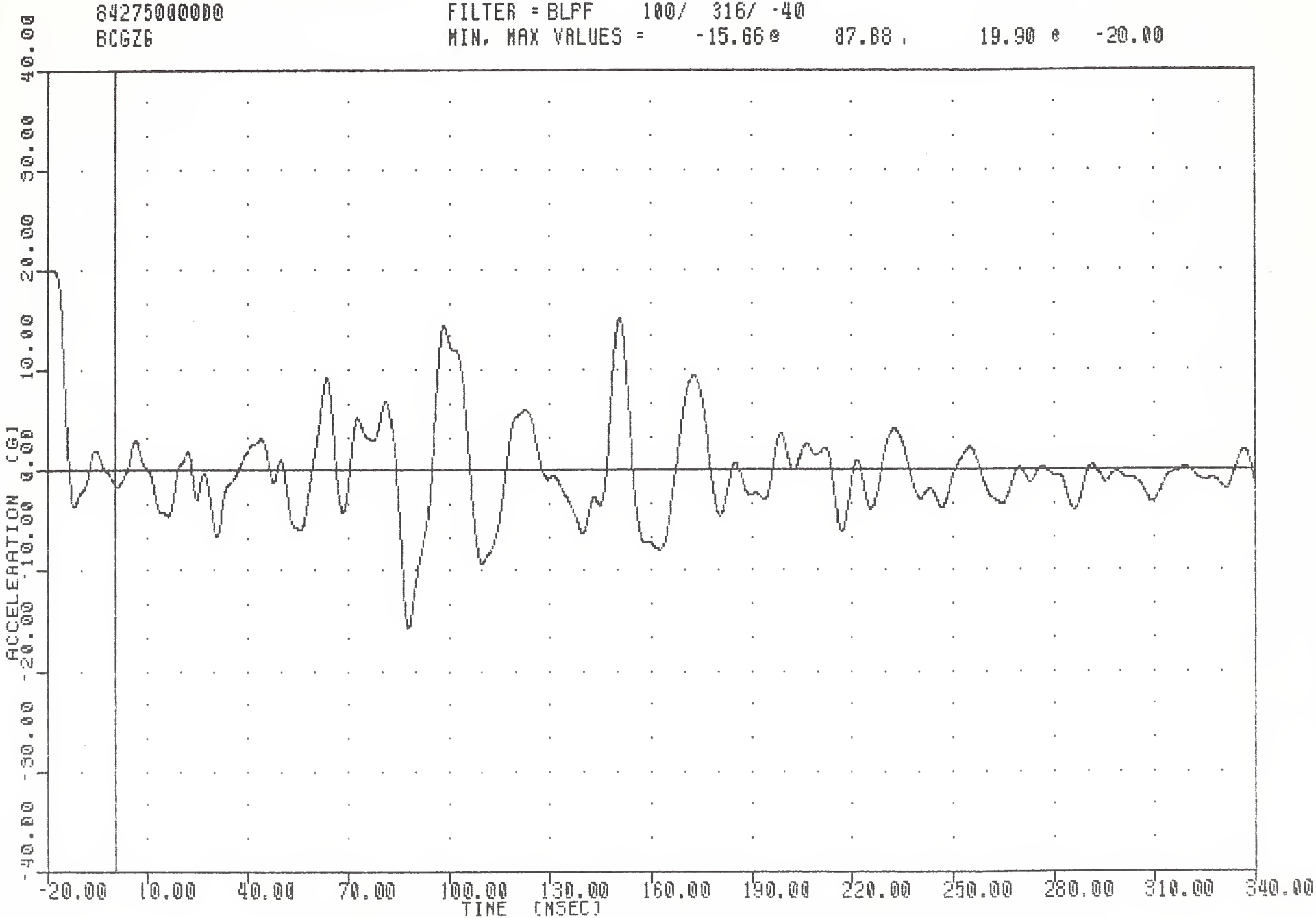


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY X AXIS

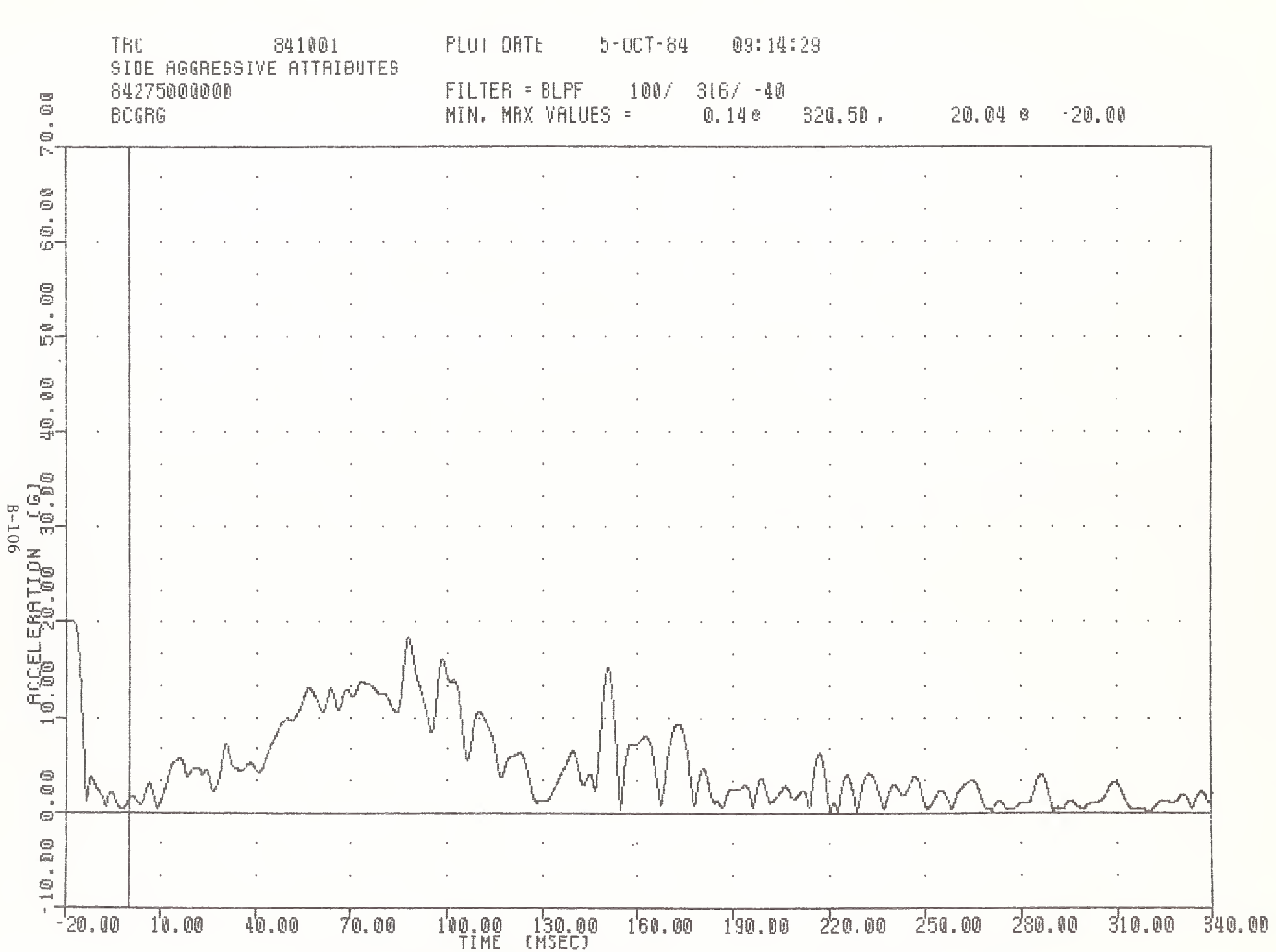
TRC , 841001 PLOT DATE 5-OCT-84 09:13:13
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = BLPF 100/ 316/ -40
BCGYG MIN, MAX VALUES = -5.09@ 92.75 , 2.12 @ 146.75



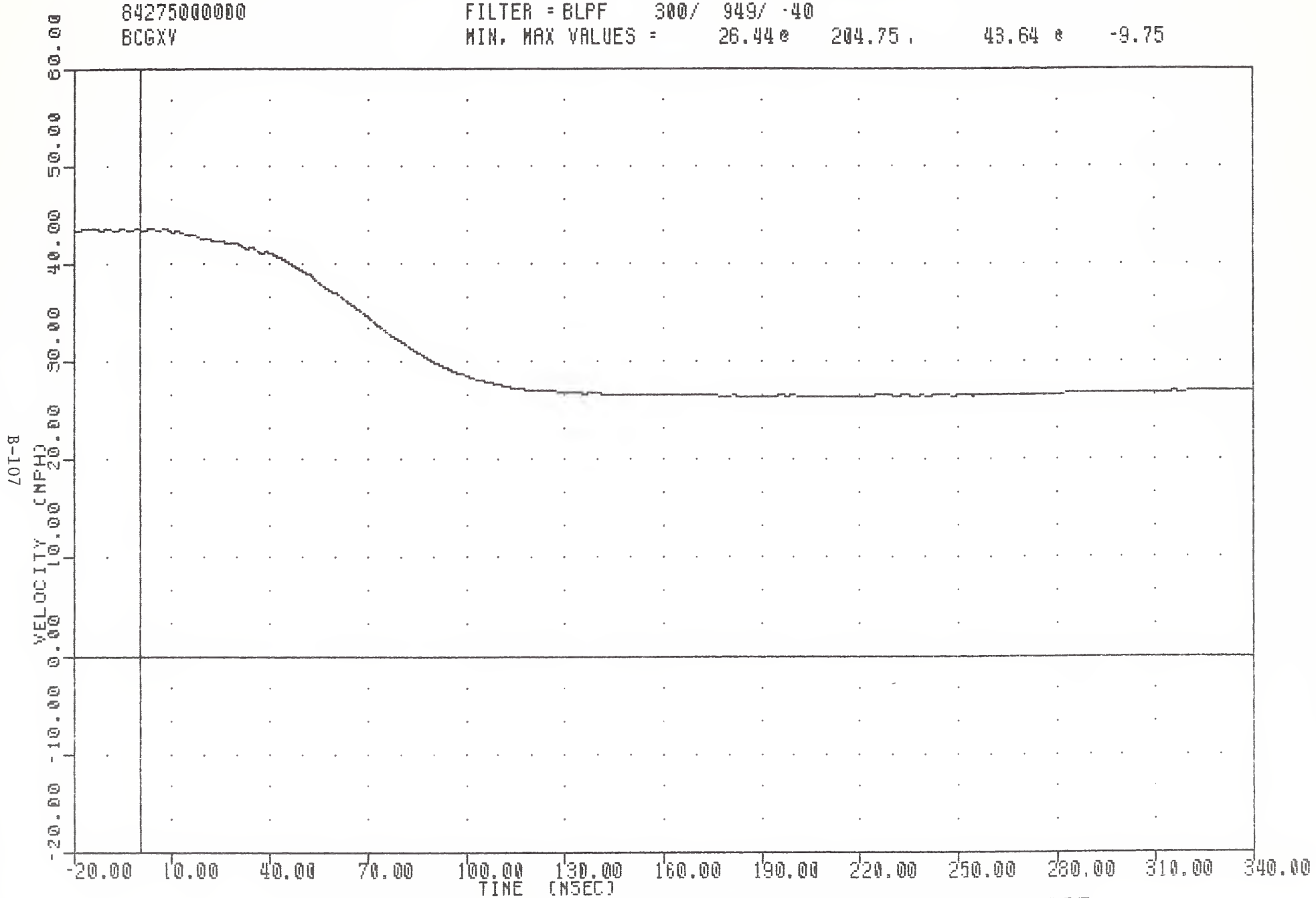
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY Y AXIS



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CENTER OF GRAVITY Z AXIS

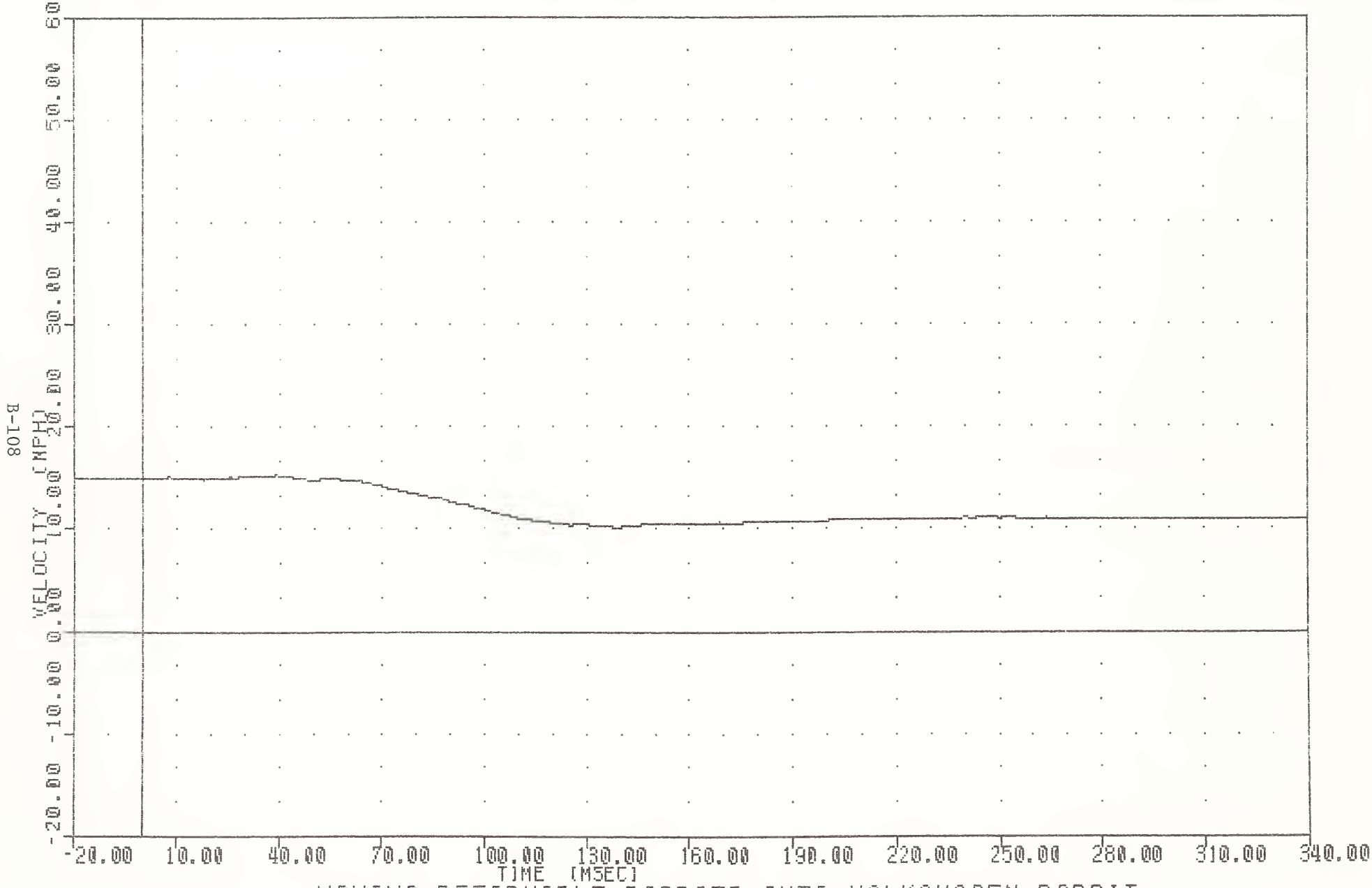


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER CG RESULTANT

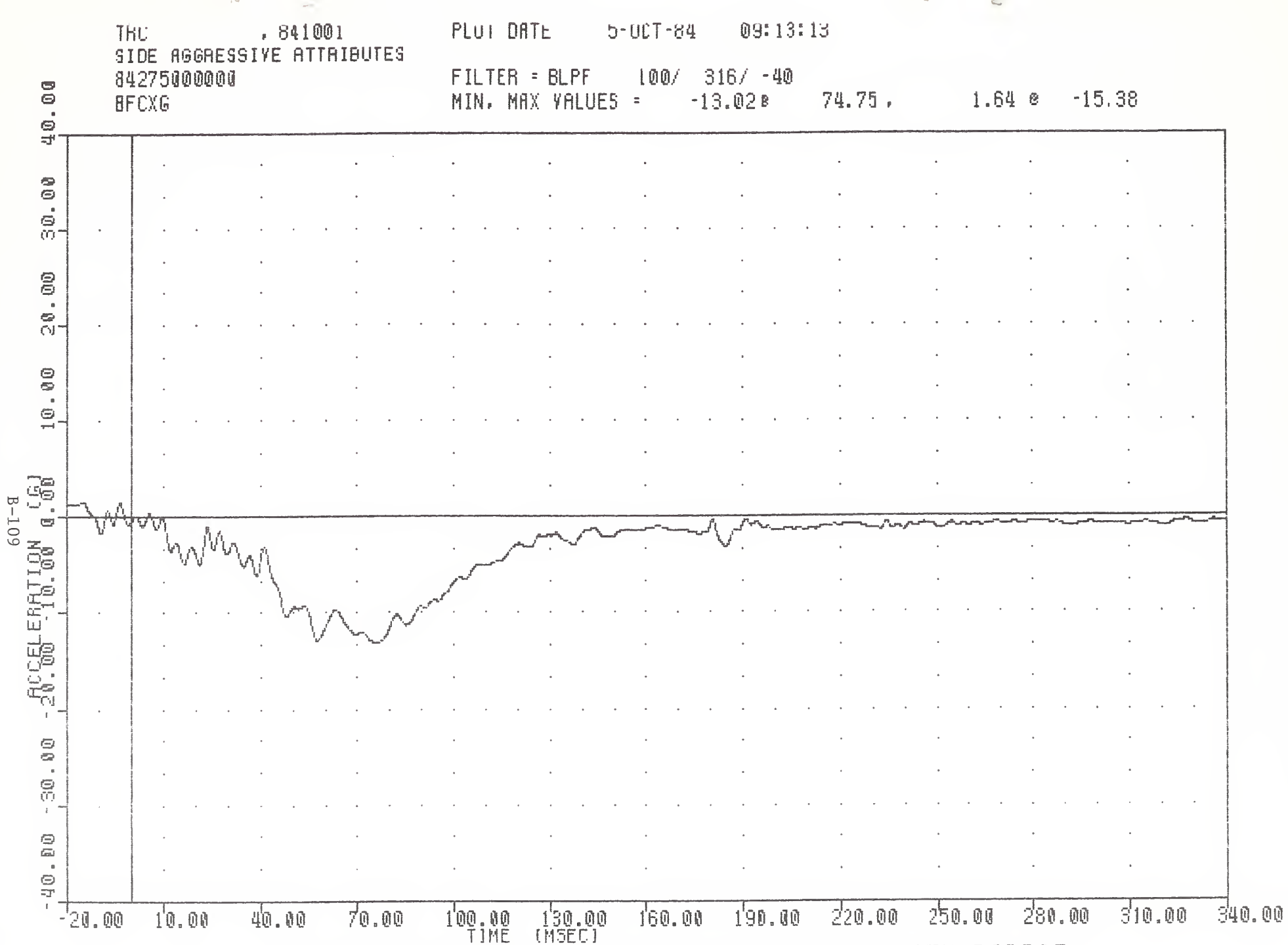


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BCGXG

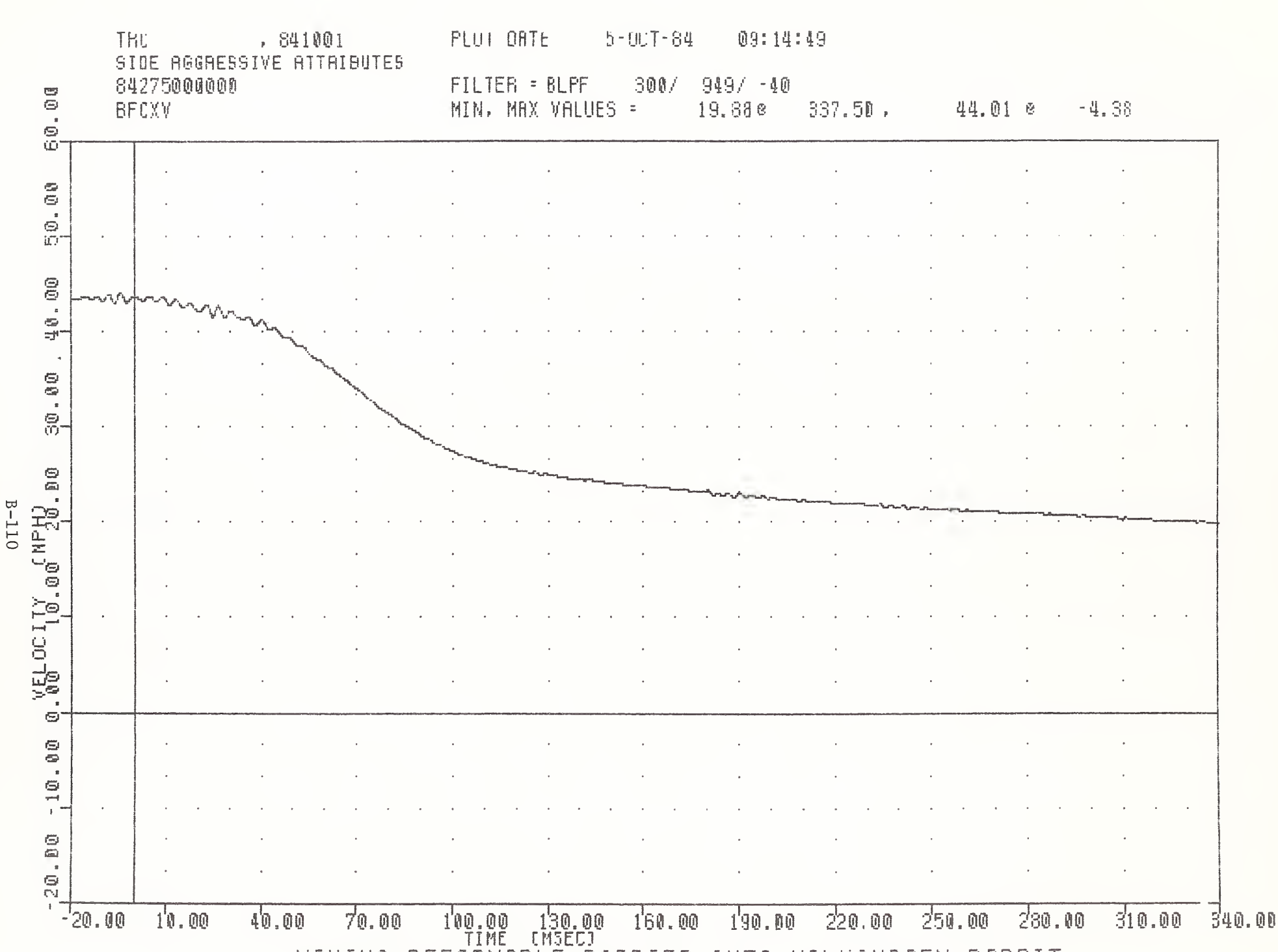
THC , 841001 PLOT DATE 5-OCT-84 09:14:49
SIDE AGGRESSIVE ATTRIBUTES
842750000000 FILTER = BLPF 300/ 949/ -40
BCGYV MIN. MAX VALUES = 10.15 @ 138.88 , 15.29 @ 38.88



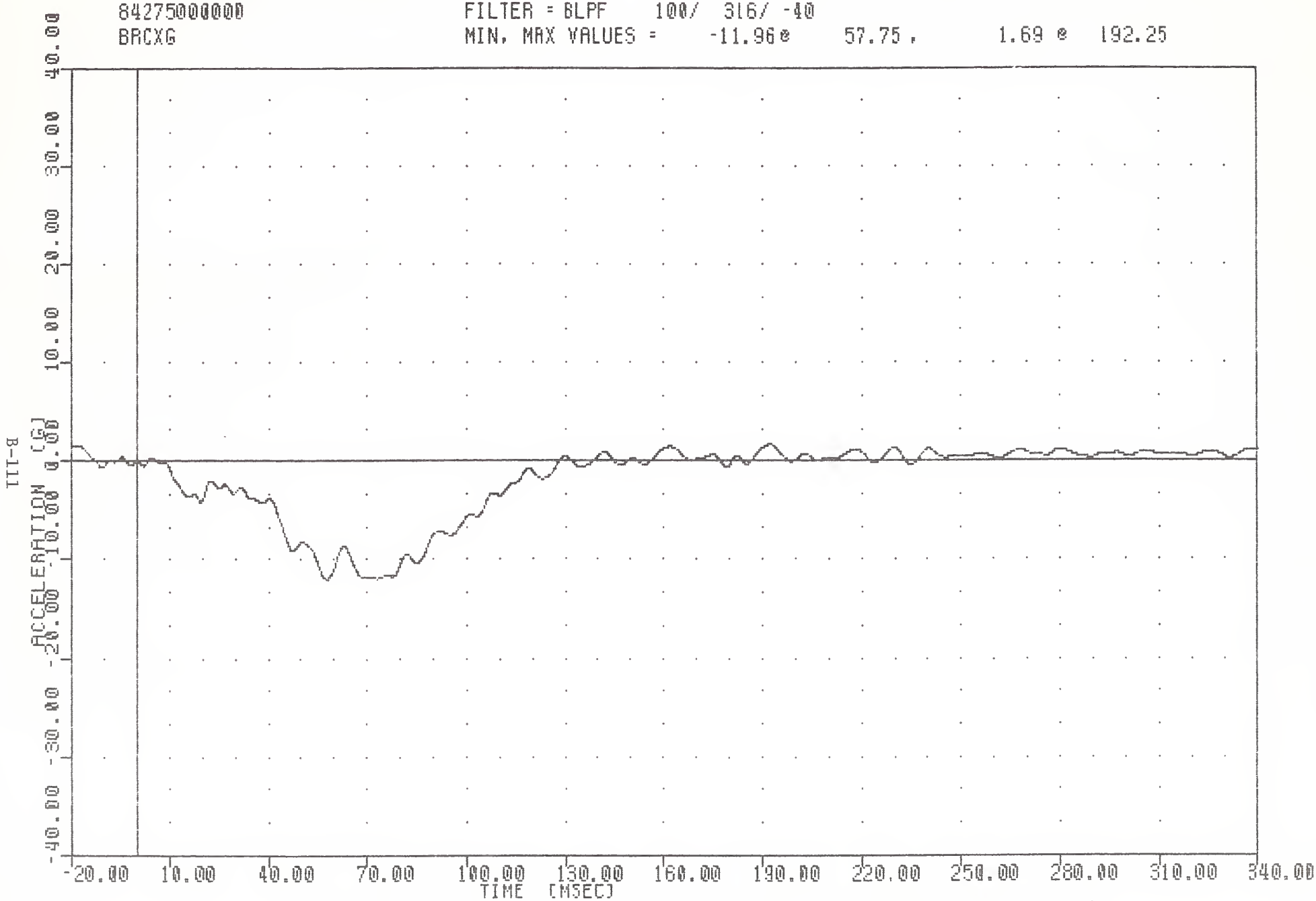
MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BCGYG



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER FRONT CROSSMEMBER ACCELERATION X AXIS

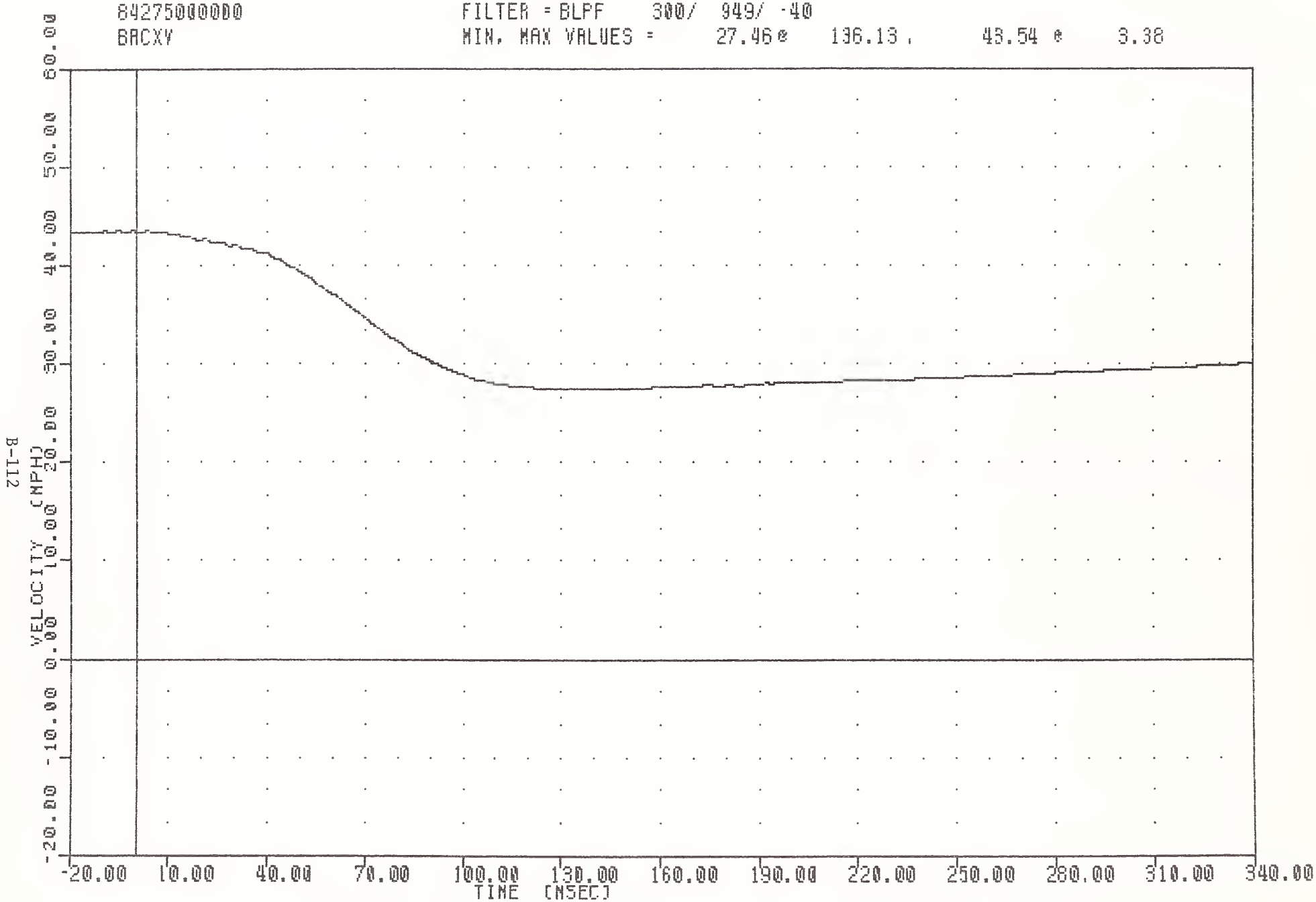


MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BFCXG



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
BARRIER REAR CROSSMEMBER ACCELERATION X AXIS

TRC , 841001 PLOT DATE 5-OCT-84 09:14:49
SIDE AGGRESSIVE ATTRIBUTES
84275000000 FILTER = BLPF 300/ 949/ -40
BRCXV MIN, MAX VALUES = 27.46 @ 136.13 , 43.54 @ 3.38



MOVING DEFORMABLE BARRIER INTO VOLKSWAGEN RABBIT
DELTA V USING BRCXG